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LUMBER RIVER BASIN AQUATIC INVENTORY

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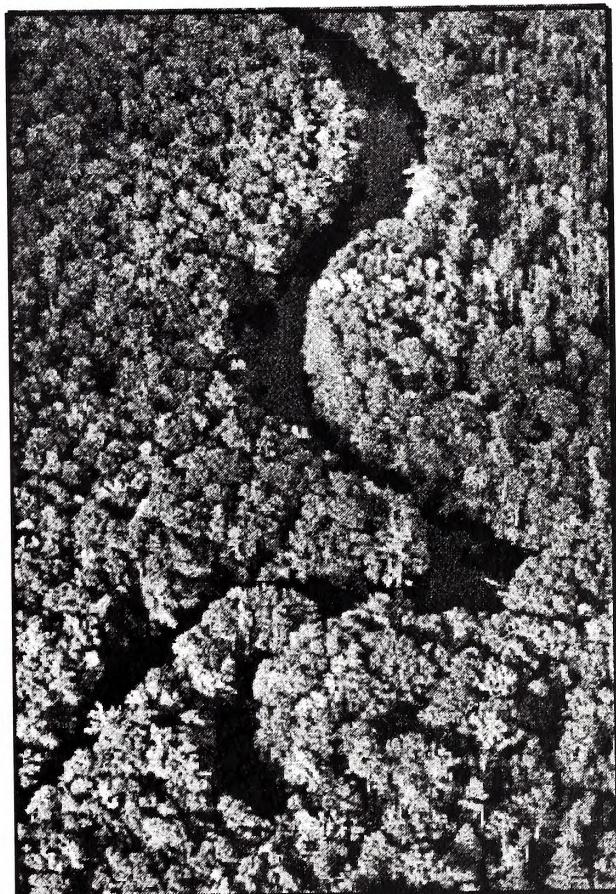
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LUMBER RIVER BASIN AQUATIC INVENTORY



Lumber River



Lumber River



Table of Contents

| | Page |
|---|-------------|
| Introduction and Acknowledgments..... | 1 |
| Aquatic Snails..... | 3 |
| Freshwater Mussels and Sphaeriid Clams..... | 8 |
| Crayfish..... | 16 |
| Freshwater Fish..... | 23 |
| Animal Facilities..... | 36 |

Lumber River Basin Aquatic Inventory

Introduction

The Lumber River Basin encompasses 8 counties in North Carolina and extends into South Carolina. The headwaters begin in Moore and Montgomery counties and flow through Richmond. On the Hoke/Scotland county line, Drowning Creek becomes the Lumber River at SR 1412 (Scotland Co.) or Bicycle 1. The river then meanders through Robeson and Columbus counties and its tributaries reach into Bladen County. This is a black water system with the acidity levels becoming higher closer to the river. The Lumber River is considered a State Wild and Scenic River.

The Lumber River State Park begins at SR 1412 in Scotland County and ends at the North Carolina/South Carolina border. The park is made up almost entirely of the Lumber River and it comprises 115 river miles and 1600 acres of land. Before the river became a state park, it was used for logging, commercial fishing, trading, and recreational purposes. Due to the concern raised by local citizens, the Division of State Parks purchased land and is in the process of acquiring more land for the park. The Lumber River State Park became available for public use in 1989.

The purpose of this project was to survey for aquatic species, including crayfish, fish, snails, mussels, and sphaeriid clams. Our inventory included the Lumber River Basin in North Carolina. Figure 1 details the localities of all stations surveyed. The following sections provide information on the species in the above taxa documented at each site in the survey area.

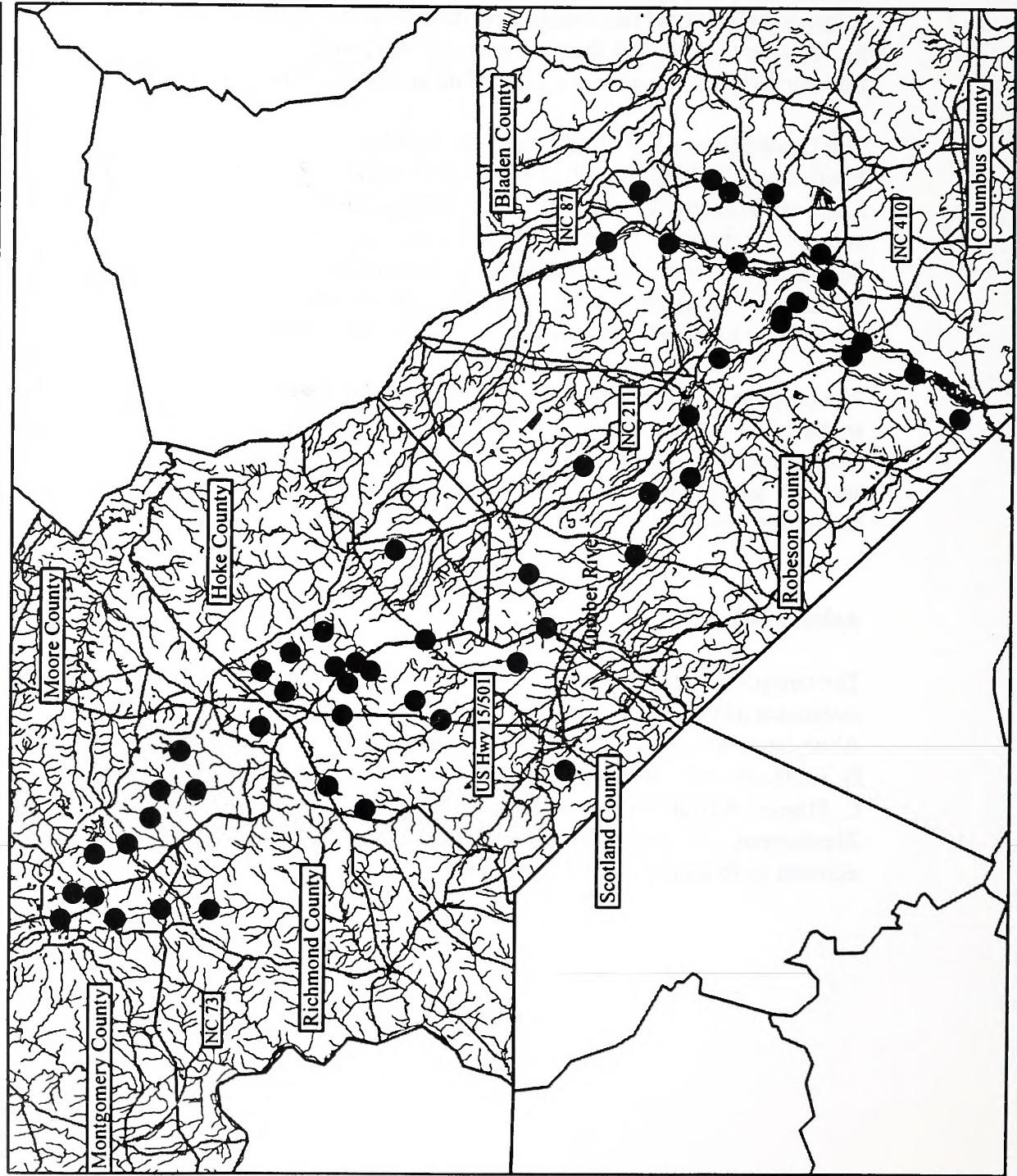
Acknowledgments

The completion of this project would not have been possible without the invaluable assistance of the following people: John M. Alderman, Art Bogan, Keith W. Ashley, Alvin Braswell, Alan R. Clark, John E. Cooper, Tom Henson, Judith A. Johnson, Andrew H. McDaniel, Jr., Chris McGrath, Bob Pegram, Louis P. Polletta, Danny Smith, Wayne C. Starnes, Ken R. Taylor, Randall C. Wilson, Melissa R. Wood, and Mara Savacool Zimmerman. I would also like to thank the state park staff and the landowners who allowed us to work on their properties.

Gabriela B. Mottesi

LUMBER RIVER BASIN AQUATIC INVENTORY

Figure 1.



Aquatic Snails

Introduction

There are approximately 500 species of aquatic snails currently recognized in North America. These 500 species are divided into 78 genera and 15 families (Burch 1989). In North Carolina, there are approximately 52 species representing 8 families (Adams 1990).

Snails are grouped into one of two subclasses. Prosobranch snails are gill-breathing and have an operculum, which is a calcareous plate that closes the aperture when the snail withdraws into its shell. Pulmonate snails are lung-breathing and do not have an operculum to seal their aperture (Burch 1989).

These animals graze on algae and other microscopic organisms using radular teeth to grind food to an appropriate size for consumption. Snails are an essential part of aquatic ecosystems, as well as indicators of water quality. However, they are typically overlooked. The lack of information and knowledge of snails can be attributed, in part, to their minute size, perceived lack of activity, cryptic habits, and difficulty in identification.

Methods

Study areas for this project included the aquatic habitats associated with the Lumber River Basin (Fig. 1, Introduction Section). Most habitats of the headwaters of the Lumber River Basin can be described as riffle/run with slow to fast flow. Pools of different sizes with slow flow were also present. Substrate included combinations of silt/sand/gravel/woody debris and leaf litter. Aquatic vegetation and organic debris were also present. The river habitat was slow to fast flow pools, with a silt/sand/gravel/woody debris and leaf litter substrate. Certain tributaries of the river were swampy with abundant aquatic vegetation. Throughout the basin there was a good hardwood/pine buffer with occasional cypress. The pH in this basin ranged from 4.3 - 7.2.

Snails were collected throughout the Lumber River Basin (Fig. 1). Various techniques were utilized including visual and tactile searches. Due to the cryptic habits of some snail species, it was necessary to sift and dredge the substrate. All available habitats were sampled. Snails were preserved and stored in 70% ethanol.

Snails and limpet snails were identified using Burch (1989) and Basch (1963). Expected distributions and the following characteristics were used to identify the specimens: presence/absence of an operculum, direction of coiling, shell size, shape, color and thickness, texture of the shell, placement of apex, shape and number of the whorls, and the shape of the apertural lip. With the acquisition of additional information, identifications may be subject to change.

Results and Discussion

Snails were located at twenty-two of the sites surveyed (Fig. 1). At least nine species representing six families and both subclasses were found within the Lumber River Basin (Table 1).

Campeloma decisum (Say, 1816), *Pseudosuccinea columella* (Say, 1817), *Physella* sp., and *Helisoma anceps* (Menke, 1830) were collected in the backwater areas with slow flow in the silt/sand substrate. *Helisoma anceps*, *Pseudosuccinea columella*, and *Physella* sp. were also found on aquatic vegetation, along with *Menetus dilatatus* (Gould, 1841). *Campeloma decisum* is considered a species complex (Adams, pers. comm. 1995). Therefore, when more information is acquired, this species complex may be separated into a few recognizable species.

Gillia altilis (I. Lea, 1841) was found on aquatic vegetation. The limpet snails, *Ferrissi fragilis* (Tryon, 1863), *Ferrissia rivularis* (Say, 1817), and *Laevapex fuscus* (C.B. Adams, 1841), were found on the underside of the leaves of the aquatic vegetation and on rocks and woody debris in the slower current.

The Lumber River Basin supports a good abundance and diversity of snails. As is shown in Table 2, most species were found in good numbers at each site.

Resources

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Basch, P. F. 1963. A review of the recent freshwater limpet snails of North America (Mollusca: Pulmonata). Bulletin: *Museum of Comparative Zoology*, Harvard University. 129(8): 399-461.

Burch, J. B. 1989. *North American Freshwater Snails*. Malacological Publications. Hamburg, MI. 365 pp.

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Table 1. Snails found in the Lumber River Basin

Prosobranchia

Hydrobiidae

Gillia altilis (I. Lea, 1841)

Buffalo pebblesnail

Viviparidae

Campeloma decisum (Say, 1816)

Pointed campeloma

Pulmonata

Lymnaeidae

Pseudosuccinea columella (Say, 1817)

Mimic lymnaea

Physidae

Physella sp.

Planorbidae

Helisoma anceps (Menke, 1830)

Two-ridge rams-horn

Menetus dilatatus (Gould, 1841)

Bugle sprite

Ancylidae

Ferrissi fragilis (Tryon, 1863)

Fragile ancylid

Ferrissia rivularis (Say, 1817)

Creeping ancylid

Laevapex fuscus (C.B. Adams, 1841)

Dusky ancylid

LUMBER RIVER BASIN AQUATIC SNAIL SPECIES INVENTORY

Figure 1.

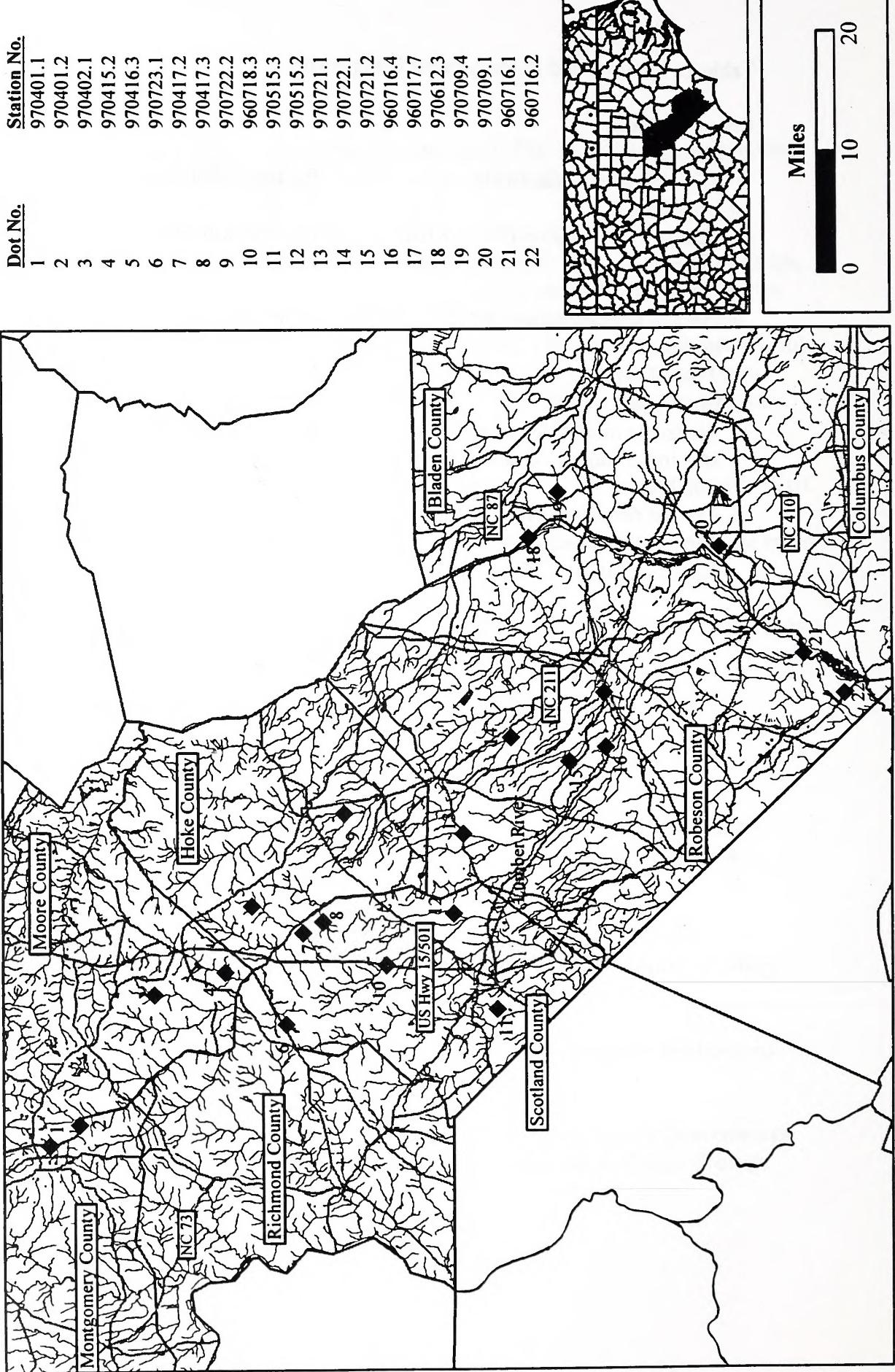


Table 2. Snails found in the Lumber River Basin

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No. Identified By</u> |
|--------------------|---------------------------------|---------------------------|------------------------|---------------|-------------|--------------------------|
| 960716.1 | <i>Campeloma decisum</i> | Lumber River | Colun./Rob. line | 16 July 1996 | 8 | G.B. Mottesi |
| 960716.2 | <i>Ferrissia fragilis</i> | Roadside ditch | Robeson | 16 July 1996 | 11 | G.B. Mottesi |
| 960716.4 | <i>Physella sp.</i> | Lumber River | Robeson | 16 July 1996 | 6 | G.B. Mottesi |
| 960717.7 | <i>Campeloma decisum</i> | Lumber River | Robeson | 17 July 1996 | 3 | G.B. Mottesi |
| 960718.3 | <i>Laevapex fuscus</i> | Juniper Creek | Scotland | 18 July 1996 | 10 | G.B. Mottesi |
| 970401.1 | <i>Helisoma anceps</i> | Drowning Creek | Mont/Moore line | 1 April 1997 | 1 | G.B. Mottesi |
| 970401.2 | <i>Physella sp.</i> | Drowning Creek | Mont/Moore line | 1 April 1997 | 1 | G.B. Mottesi |
| 970402.1 | <i>Pseudosuccinea columella</i> | Horse Creek | Moore | 2 April 1997 | 1 | A. Bogan |
| 970415.2 | <i>Ferrissia rivularis</i> | trib. to Drowning Creek | Moore | 15 April 1997 | 7 | G.B. Mottesi |
| 970416.3 | <i>Ferrissia rivularis</i> | Mountain Creek | Hoke | 16 April 1997 | 3 | G.B. Mottesi |
| 970417.2 | <i>Ferrissia fragilis</i> | trib. to Drowning Creek | SR 1219 | 17 April 1997 | 7 | G.B. Mottesi |
| 970417.3 | <i>Ferrissia fragilis</i> | trib. to Drowning Creek | SR 1400 | 17 April 1997 | 22 | G.B. Mottesi |
| 970515.2 | <i>Physella sp.</i> | Big Shoe Heel Creek | SR 1412 | 15 May 1997 | 3 | G.B. Mottesi |
| 970515.2 | <i>Menetus dilatatus</i> | Big Shoe Heel Creek | SR 1433 | 15 May 1997 | 2 | G.B. Mottesi |
| 970515.2 | <i>Laevapex fuscus</i> | Big Shoe Heel Creek | SR 1433 | 15 May 1997 | 2 | G.B. Mottesi |
| 970515.3 | <i>Laevapex fuscus</i> | trib. to Gum Swamp Creek | SR 1108 | 15 May 1997 | 4 | G.B. Mottesi |
| 970515.3 | <i>Menetus dilatatus</i> | trib. to Gum Swamp Creek | SR 1108 | 15 May 1997 | 6 | G.B. Mottesi |
| 970515.3 | <i>Physella sp.</i> | trib. to Gum Swamp Creek | SR 1108 | 15 May 1997 | 4 | G.B. Mottesi |
| 970515.3 | <i>Pseudosuccinea columella</i> | trib. to Gum Swamp Creek | SR 1108 | 15 May 1997 | 23 | G.B. Mottesi |
| 970612.3 | <i>Laevapex fuscus</i> | Big Swamp | SR 1004 | 12 June 1997 | 36 | G.B. Mottesi |
| 970709.1 | <i>Ferrissia fragilis</i> | Slender Branch | Bladen/Rob. line | 9 July 1997 | 10 | G.B. Mottesi |
| 970709.4 | <i>Ferrissia fragilis</i> | Black Reedy Meadows Swamp | Bladen | 9 July 1997 | 43 | G.B. Mottesi |
| 970721.1 | <i>Pseudosuccinea columella</i> | Jordan's Swamp | NC 71 | 21 July 1997 | 2 | G.B. Mottesi |
| 970721.2 | <i>Pseudosuccinea columella</i> | Bear Swamp | SR 1003 | 21 July 1997 | 9 | G.B. Mottesi |
| 970721.2 | <i>Physella sp.</i> | Bear Swamp | SR 1003 | 21 July 1997 | 4 | G.B. Mottesi |
| 970721.2 | <i>Gillia attilis</i> | Bear Swamp | SR 1003 | 21 July 1997 | 17 | G.B. Mottesi |
| 970721.2 | <i>Menetus dilatatus</i> | Bear Swamp | SR 1003 | 21 July 1997 | 6 | G.B. Mottesi |
| 970722.1 | <i>Laevapex fuscus</i> | Richland Swamp | SR 1318 | 22 July 1997 | 37 | G.B. Mottesi |
| 970722.1 | <i>Pseudosuccinea columella</i> | Richland Swamp | SR 1318 | 22 July 1997 | 7 | G.B. Mottesi |
| 970722.1 | <i>Physella sp.</i> | Richland Swamp | SR 1318 | 22 July 1997 | 1 | G.B. Mottesi |
| 970722.1 | <i>Menetus dilatatus</i> | Richland Swamp | SR 1318 | 22 July 1997 | 1 | G.B. Mottesi |
| 970722.2 | <i>Ferrissia fragilis</i> | Toney's Creek | SR 1138 | 22 July 1997 | 13 | G.B. Mottesi |
| 970722.2 | <i>Physella sp.</i> | Toney's Creek | SR 1138 | 22 July 1997 | 1 | G.B. Mottesi |
| 970722.2 | <i>Pseudosuccinea columella</i> | Muddy Creek | SR 1138 | 23 July 1997 | 17 | G.B. Mottesi |
| 970723.1 | <i>Laevapex fuscus</i> | | Scotland | 23 July 1997 | 5 | G.B. Mottesi |

Freshwater Mussels and Sphaeriid Clams

Introduction

Freshwater mussels are in the Class Bivalvia. As the name implies, the mussel is separated into right and left shell-secreting centers. The shell itself is a single entity which is divided into right and left portions. Mussels are characterized by having greatly enlarged gills with ciliated filaments for filter feeding. They are an integral part of many aquatic ecosystems. They provide nutrients for insects and other invertebrates and are a food source for other organisms. Due to the fact that they are filter feeders, they are excellent indicators of water quality.

There are approximately 300 species and subspecies of freshwater mussels in the United States. The greatest diversity of these mussels occurs in the Southeast. Roughly 70 species can be found in North Carolina. Unfortunately, approximately half are state listed as Endangered, Threatened, or species of Special Concern (Adams 1990). It appears that the mussel fauna of the United States is in danger of extinction (Williams, et al. 1992). Therefore, it is necessary that we determine the status and distribution of these organisms so that proper management techniques can be applied.

Sphaeriid clams, like freshwater mussels, are in the Class Bivalvia and are filter feeders. The members of this family are considered the pea, pill, nut, or fingernail clams. Due to their well-developed mechanism of passive dispersal and adaptability, sphaeriid clams can be found in almost any body of freshwater. Therefore, their distributions are considered truly cosmopolitan (Branson 1988). In spite of their cosmopolitan distribution, not much is known about sphaeriid clams. They are represented in North America by 38 species of the family Sphaeriidae. In North Carolina, there are approximately 13 species of sphaeriid clams (Adams 1990).

One exotic species, the Asian clam (*Corbicula fluminea* (Müller 1774)), of the family Corbiculidae (Burch 1975) was introduced into this country in 1937 and was found in most of the area surveyed.

Methods

Study areas for this project included the aquatic habitats associated with the Lumber River Basin (Fig. 1, Introduction Section). Most habitats of the headwaters of the Lumber River Basin can be described as riffle/run with slow to fast flow. Pools of different sizes with slow flow were also present. Substrate included combinations of silt/sand/gravel/woody debris and leaf litter. Aquatic vegetation and organic debris were also present. The river habitat was slow to fast flow pools, with a silt/sand/gravel/woody debris and leaf litter substrate. Certain tributaries of the river were swampy with

abundant aquatic vegetation. Throughout the basin there was a good hardwood/pine buffer with occasional cypress. The pH in this basin ranged from 4.3 - 7.2.

Freshwater mussels were collected throughout the Lumber River Basin (Fig. 1). Various techniques were utilized including SCUBA, snorkeling, sifting of the substrate, visual and tactile searches, and visual searches of the shores for shells. Live mussels were identified, measured, and returned unharmed to the appropriate habitat. Fresh shells were identified, measured, and kept for curation.

Sphaeriid clams were also collected throughout the Lumber River Basin (Fig. 2). Various techniques were utilized including seining, dip netting, sifting of the substrate, and visual and tactile searches. Specimens were preserved and stored in 70% ethanol. Sphaeriid clams were identified using Branson (1988), Burch (1975), and Clarke (1981). With the acquisition of additional information, identifications made of both freshwater mussels and sphaeriid clams may be subject to change.

Results and Discussion

Figure 1 details the localities of the six stations where freshwater mussels were found. At least four species of mussels, all in the family Unionidae, were found in the Lumber River Basin.

Figure 2 details the localities of the seven stations where sphaeriid clams were found. At least three species, all within the family Sphaeriidae, were found in the Lumber River Basin.

The specimens falling into either the *Elliptio complanata* or *Elliptio icterina* complexes were listed under the *Elliptio* spp. category. Therefore, these complexes possibly contain several species. The ecophenotypes of these *Elliptio* complexes are found at numerous sites throughout eastern North Carolina (Alderman, pers. comm., 1998). Additional genetic information is necessary to determine the number of species within these complexes.

Fair diversity and abundance of both mussels and sphaeriid clams occur in the Lumber River Basin (Table 2). The fair diversity and abundance may be due to do the high acidity levels of areas within this basin. It has been suggested that at a pH of below 7.0 the calcareous shells of mollusks become highly soluble and this requires that these animals precipitate fresh calcium carbonate faster than it can be dissolved (D'itri 1982). This creates a stress for these organisms because of the reduction of the availability of the calcium carbonate necessary for shell development. Unfortunately, no work has been done to see how pH affects organisms that have been established for a prolonged period of time in a low pH environment.

Resources

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Table 1. Mussels and Sphaeriid clams found in the Lumber River Basin

Unionidae

Elliptio congregaea (I. Lea, 1831) Carolina slabshell

Elliptio spp.

lanceolate elliptio

Uniomerus sp.

Sphaeriidae

Musculium securis (Prime, 1852) Pond fingernailclam

Pisidium sp.

Sphaerium striatinum (Lamarck, 1818) Striated fingernailclam

LUMBER RIVER BASIN MUSSEL SPECIES INVENTORY

Figure 1.

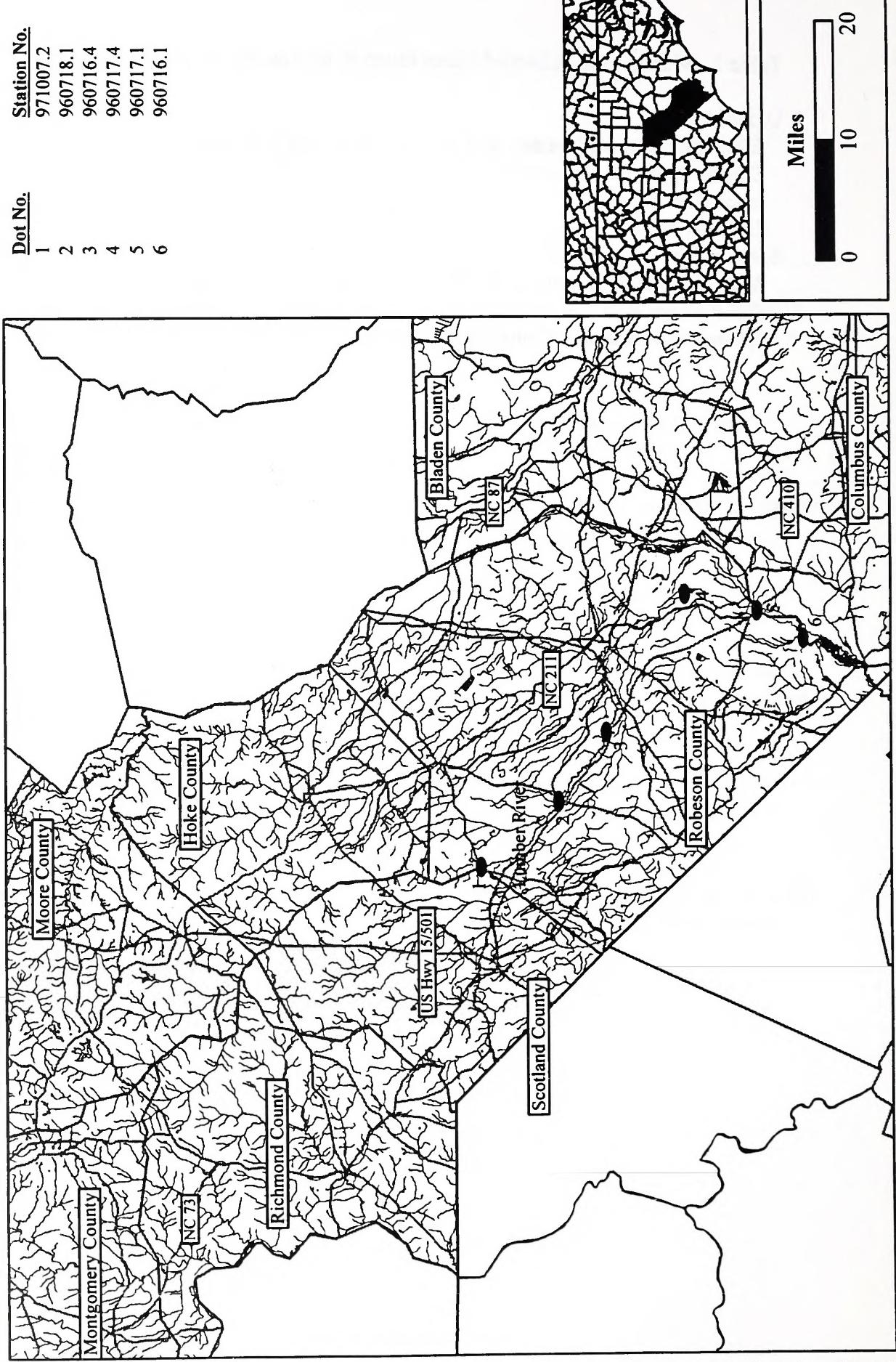


Table 2. Mussels found in the Lumber River Basin

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No. (live)</u> | <u>No. (shell)</u> |
|--------------------|----------------------------|-----------------|---------------------------|------------------|--------------|-------------------|--------------------|
| 960716.1 | <i>Elliptio congenera</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 16 July 1996 | 2 | 5 |
| 960716.1 | <i>Elliptio spp.</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 16 July 1996 | 4 | 35 |
| 960716.1 | <i>lanceolate elliptio</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 16 July 1996 | 1 | 2 |
| 960716.1 | <i>Elliptio spp.</i> | Lumber River | SR 1550 | Robeson | 16 July 1996 | 120 | 2 |
| 960716.4 | <i>Unionomerus sp.</i> | Lumber River | SR 1550 | Robeson | 16 July 1996 | 12 | |
| 960716.4 | <i>Elliptio spp.</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 12 | |
| 960717.1 | <i>Elliptio spp.</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 5 | |
| 960717.1 | <i>lanceolate elliptio</i> | Lumber River | SR 2123 | Robeson | 17 July 1996 | 5 | observed |
| 960717.4 | <i>lanceolate elliptio</i> | Lumber River | SR 2123 | Robeson | 17 July 1996 | 1 | observed |
| 960717.4 | <i>Elliptio spp.</i> | Lumber River | NC 710 | Robeson | 18 July 1996 | 1 | |
| 960718.1 | <i>Elliptio spp.</i> | Lumber River | NC 710 | Robeson | 18 July 1996 | 3 | |
| 960718.1 | <i>Unionomerus sp.</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 7 Oct. 1997 | 2 | 1 |
| 971007.1 | <i>Elliptio congenera</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 7 Oct. 1997 | 1 | |
| 971007.1 | <i>lanceolate elliptio</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 7 Oct. 1997 | 1 | |
| 971007.1 | <i>Unionomerus sp.</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 7 Oct. 1997 | 16 | 1 |
| 971007.1 | <i>Elliptio spp.</i> | Lumber River | SR 2246/2247, LRSP | Rob./Scot. line | 7 Oct. 1997 | 12 | |
| 971007.2 | <i>Elliptio spp.</i> | Lumber River | NC 71 | Rob./Scot. line | 7 Oct. 1997 | 28 | |
| 971007.2 | <i>Unionomerus sp.</i> | Lumber River | NC 71 | Rob./Scot. line | 7 Oct. 1997 | | |

LUMBER RIVER BASIN SPHAERID CLAM SPECIES INVENTORY

Figure 2.

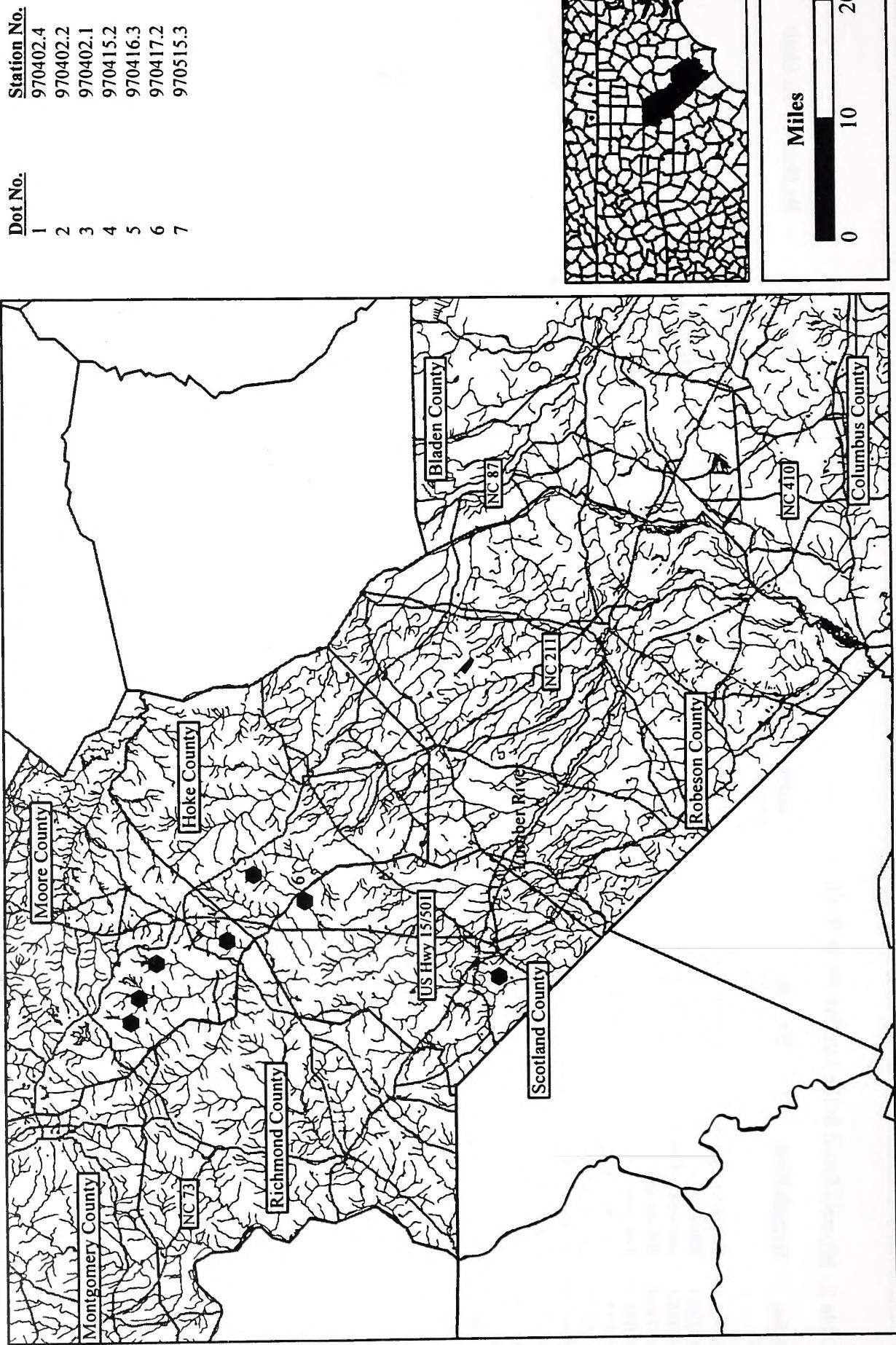


Table 3. Sphaeriid clams found in the Lumber River Basin

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No.</u> | <u>Identified By</u> |
|--------------------|---------------------------|--------------------------|------------------------|---------------|---------------|------------|----------------------|
| 970402.1 | <i>Musculium securis</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 4 | A. Bogan |
| 970402.1 | <i>Pisidium sp.</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 8 | A. Bogan |
| 970402.2 | <i>Musculium securis</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 2 | G.B. Mottesi |
| 970402.4 | <i>Musculium securis</i> | trib. to Drowning Creek | SR 1122 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970415.2 | <i>Musculium securis</i> | trib. to Drowning Creek | SR 1100 | Moore | 15 April 1997 | 1 | G.B. Mottesi |
| 970416.3 | <i>Musculium securis</i> | Mountain Creek | SR 1219 | Hoke | 16 April 1997 | 2 | G.B. Mottesi |
| 970417.2 | <i>Sphaerium striatum</i> | trib. to Drowning Creek | SR 1400 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970515.3 | <i>Musculium securis</i> | trib. to Gum Swamp Creek | SR 1108 | Scotland | 15 May 1997 | 9 | G.B. Mottesi |

Crayfish

Introduction

There are currently 338 recognized species of crayfish in the United States and Canada, the greatest diversity of which reside in the Southeast (Taylor et al. 1996). In North Carolina, there are 30 native and 2 introduced species of crayfish (Cooper, pers. comm., 1998). Of these 32 species, nine are listed as significantly rare by the North Carolina Natural Heritage Program (LeGrand and Hall 1995).

Crayfish play a significant role in aquatic ecosystems by representing a large percentage of the biomass in lentic and lotic waters. They are gill breathing organisms and require an aquatic habitat to absorb oxygen from the water. In accordance with habitat preferences, crayfish are classified as either non-burrowers or burrowers. Non-burrowers spend their entire life in the stream bed while burrowers excavate tunnels in roadside ditches, wet pastures, and flood plains (Taylor et al. 1996). Different species of burrowers spend different amounts of their life cycle in subterranean domains.

In the family Cambaridae (which includes all North Carolina species), there are two designations for adult male crayfish: Form I and Form II. Throughout their lives, adult males cycle between these forms. Morphologically both forms are similar except in the texture and shape of the first pleopod (the sexual organ). Form I males are able to sexually reproduce while Form II males are not. Unlike adult males, adult females do not cycle between morphological forms and once they reach adulthood, they can sexually reproduce.

Methods

Study areas for this project included the aquatic habitats associated with the Lumber River Basin (Fig. 1, Introduction Section). Most habitats of the headwaters of the Lumber River Basin can be described as riffle/run with slow to fast flow. Pools of different sizes with slow flow were also present. Substrate included combinations of silt/sand/gravel/woody debris and leaf litter. Aquatic vegetation and organic debris were also present. The river habitat was slow to fast flow pools, with a silt/sand/gravel/woody debris and leaf litter substrate. Certain tributaries of the river were swampy with abundant aquatic vegetation. Throughout the basin there was a good hardwood/pine buffer with occasional cypress. The pH in this basin ranged from 4.3 - 7.2.

Crayfish were collected throughout the Lumber River Basin (Fig. 1). Collecting techniques included the use of dip nets, and a 6' x 10' minnow seine. Specimens were preserved and stored in 70% ethanol.

The following sources were consulted for identification: Cooper (1998), Hobbs (1989), Hobbs (1991), and Page (1985). Dr. John Cooper, NC State Museum of Natural Sciences, and Mara Savacool Zimmerman also provided invaluable assistance. With additional information, the present identifications may be subject to change.

The key feature used to differentiate crayfish species from one another is the morphology and structure of the first pleopod pair of the Form I male. Form II males, juvenile males, and females can be recognized by their carapace, chelae, rostrum shape, and body coloration.

Specimens were recorded as Form I male (MI), Form II male (MII), juvenile male (jM), adult female (F), and juvenile female (jF). Adult versus juvenile specimens were distinguished based on size. Carapace length was measured from the tip of the rostrum to the posterior carapace edge (Page 1985).

Results and Discussion

Figure 1 details the localities of the thirty-five stations where crayfish were found. Four species of crayfish were found within the Lumber River Basin (Table 1).

Cambarus (P.) sp. C was found in riffle/run habitat over sand/gravel. A total of 57 specimens were collected (2MI, 13MII, 17jM, 12F, 13jF). Carapace length ranged from 14.80 to 38.05 mm. Form I males were collected on 2 & 16 April 1997. *Cambarus (P.)* sp. C is a species complex which occurs across the Coastal Plain, Piedmont, and Mountain physiographic regions of North Carolina and currently awaits further clarification (Cooper and Braswell 1995).

Procambarus (O.) acutus acutus (Girard, 1852) was found in pool habitat and among aquatic vegetation. A total of 21 specimens were collected (2MI, 5MII, 3jM, 9F, 2jF). Carapace length ranged from 10.90 to 38.45 mm. Form I males were collected on 15 & 16 April 1996.

Procambarus (O.) blandningii (Harlan, 1830) was found in pool habitat and among aquatic vegetation. A total of 59 specimens were collected (5MI, 21MII, 6jM, 17F, 10jF). Carapace length ranged from 6.00 to 39.60 mm. Form I males were collected on 16 & 18 July 1996, 2 April and 15 May 1997.

Procambarus (O.) pearsei (Creaser, 1934) was found in pool habitat and among aquatic vegetation. A total of 13 specimens were collected (2MII, 2jM, 8F, 1jF). Carapace length ranged from 15.75 to 25.30 mm.

There is a good diversity and distribution of crayfish within the Lumber River Basin (Table 2).

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Table 1. Crayfish found in the Lumber River Basin

Cambaridae

Cambarus (Puncticambarus) sp. C

Procambarus (Ortmannicus) acutus acutus (Girard, 1852)

Procambarus (Ortmannicus) blandus (Harlan, 1830)

Procambarus (Ortmannicus) pearsei (Creaser, 1934)

Sandhills crayfish

LUMBER RIVER BASIN CRAYFISH SPECIES INVENTORY

Figure 1.

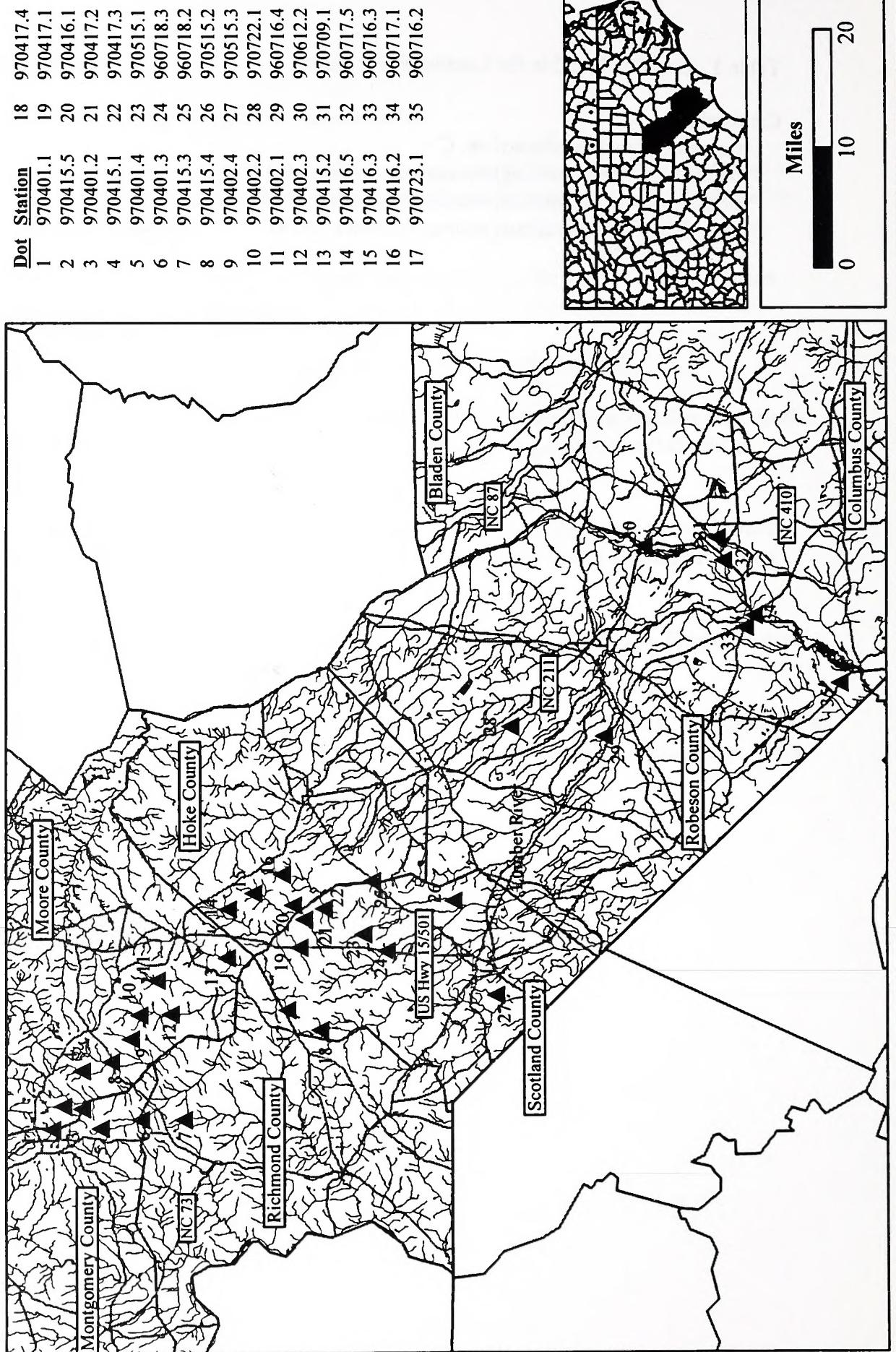


Table 2. Crayfish found in the Lumber River Basin

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>Number/Sex</u> | <u>Identified By</u> |
|--------------------|---------------------------------------|--------------------------------|---------------------------|------------------|---------------|---------------------|----------------------------|
| 960716.2 | <i>Procambarus (O.) blandingii</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | IMII, 3F | M.E. Savacool |
| 960716.3 | <i>Procambarus (O.) blandingii</i> | Roadside ditch | NC 130 | Robeson | 16 July 1996 | IMI | J.E. Cooper, M.E. Savacool |
| 960716.3 | <i>Procambarus (O.) pearsei</i> | Roadside ditch | NC 130 | Robeson | 16 July 1996 | 2MII, 2M, 7F, 1jF | J.E. Cooper, M.E. Savacool |
| 960716.4 | <i>Procambarus (O.) acutus acutus</i> | Lumber River | SR 1550 | Robeson | 16 July 1996 | IF | M.E. Savacool |
| 960717.1 | <i>Procambarus (O.) blandingii</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 2MII | J.E. Cooper, M.E. Savacool |
| 960717.5 | <i>Procambarus (O.) blandingii</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 6MII, 3F | M.E. Savacool |
| 960718.2 | <i>Procambarus (O.) blandingii</i> | Lumber River | US 401 to SR 1404 | Hoke/Seet. line | 18 July 1996 | 1MII, 2MII | J.E. Cooper, M.E. Savacool |
| 960718.3 | <i>Procambarus (O.) blandingii</i> | Juniper Creek | US 15/501 | Scotland | 18 July 1996 | IMI, IMII | M.E. Savacool |
| 970401.1 | <i>Cambarus (P.) sp. C</i> | Drowning Creek | SR 1514 | Mont./Moore line | 1 April 1997 | IMII | J.E. Cooper, M.E. Savacool |
| 970401.2 | <i>Cambarus (P.) sp. C</i> | Drowning Creek | SR 1571 | Mont./Rich. line | 1 April 1997 | 1jF | M.E. Savacool |
| 970401.3 | <i>Procambarus (O.) blandingii</i> | Naked Creek | SR 1527 | Montgomery | 1 April 1997 | 3MII, 1jM, 1jF | M.E. Savacool |
| 970401.4 | <i>Procambarus (O.) acutus acutus</i> | Naked Creek | SR 1524 | Moore | 2 April 1997 | IMI | M.E. Savacool |
| 970402.1 | <i>Cambarus (P.) sp. C</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 3F | M.E. Savacool |
| 970402.1 | <i>Procambarus (O.) blandingii</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 2F | M.E. Savacool |
| 970402.2 | <i>Cambarus (P.) sp. C</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | IMII, 4jM, 2jF | M.E. Savacool |
| 970402.3 | <i>Cambarus (P.) sp. C</i> | Deep Creek | SR 1112 | Moore | 2 April 1997 | IMI | M.E. Savacool |
| 970402.3 | <i>Procambarus (O.) blandingii</i> | Deep Creek | SR 1112 | Moore | 2 April 1997 | IF | M.E. Savacool |
| 970402.4 | <i>Cambarus (P.) sp. C</i> | trib. to Drowning Creek | SR 1122 | Moore | 15 April 1997 | IMII, 4jM, 2F, 2jF | M.E. Savacool |
| 970415.1 | <i>Cambarus (P.) sp. C</i> | trib. to Drowning Creek | SR 1129 | Moore | 15 April 1997 | IMI, IMII, 1jM, 2jF | M.E. Savacool |
| 970415.2 | <i>Procambarus (O.) acutus acutus</i> | trib. to Drowning Creek | SR 1100 | Richmond | 15 April 1997 | 3jF | M.E. Savacool |
| 970415.3 | <i>Procambarus (O.) blandingii</i> | trib. to Drowning Creek | SR 1458 | Moore | 15 April 1997 | IMII | M.E. Savacool |
| 970415.4 | <i>Procambarus (O.) blandingii</i> | trib. to trib. to Drowning Cr. | NC 73 | Moore | 15 April 1997 | 2MII, IF | M.E. Savacool |
| 970415.4 | <i>Cambarus (P.) sp. C</i> | trib. to Drowning Cr. | NC 73 | Moore | 15 April 1997 | 2jM, 1jF | M.E. Savacool |
| 970415.5 | <i>Cambarus (P.) sp. C</i> | trib. to Drowning Creek | SR 1139 | Hoke | 16 April 1997 | IMI, IMII, 3F, 3jF | M.E. Savacool |
| 970416.1 | <i>Cambarus (P.) sp. C</i> | Little Creek | SR 1216 | Hoke | 16 April 1997 | IMI, 3MII, 1jM, 2F | M.E. Savacool |
| 970416.2 | <i>Procambarus (O.) acutus acutus</i> | Buffalo Creek | SR 1214 | Hoke | 16 April 1997 | 1jM, 2jF | M.E. Savacool |
| 970416.3 | <i>Procambarus (O.) acutus acutus</i> | Mountain Creek | SR 1219 | Scotland | 17 April 1997 | 3jM, 3jF | M.E. Savacool |
| 970416.3 | <i>Cambarus (P.) sp. C</i> | Mountain Creek | SR 1219 | Scotland | 17 April 1997 | 2MII | M.E. Savacool |
| 970416.5 | <i>Cambarus (P.) sp. C</i> | trib. to Quewhaffle Creek | SR 1214 | Scotland | 17 April 1997 | 1MII, 4F | M.E. Savacool |
| 970416.5 | <i>Procambarus (O.) blandingii</i> | trib. to Quewhaffle Creek | NC 15/501 | Scotland | 17 April 1997 | 2jM, 2jF | M.E. Savacool |
| 970417.1 | <i>Cambarus (P.) sp. C</i> | trib. to Drowning Creek | SR 1400 | Scotland | 17 April 1997 | 2MII | M.E. Savacool |
| 970417.2 | <i>Cambarus (P.) sp. C</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | IMII, 4F | M.E. Savacool |
| 970417.3 | <i>Procambarus (O.) blandingii</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | 2MII, 3jM, IF, 1jF | M.E. Savacool |
| 970417.4 | <i>Procambarus (O.) blandingii</i> | trib. to Gum Swamp Creek | SR 1001 | Scotland | 17 April 1997 | 1jM | M.E. Savacool |
| 970417.4 | <i>Cambarus (P.) sp. C</i> | trib. to Gum Swamp Creek | SR 1001 | Scotland | 15 May 1997 | IMII | M.E. Savacool |
| 970515.1 | <i>Procambarus (O.) blandingii</i> | Big Shoe Heel Creek | SR 1412 | Scotland | 15 May 1997 | IMII | M.E. Savacool |
| 970515.2 | <i>Procambarus (O.) blandingii</i> | Big Shoe Heel Creek | SR 1433 | | | | |

Table 2. Crayfish found in the Lumber River Basin (cont.)

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>Number/Sex</u> | <u>Identified By</u> |
|------------------------|---------------------------------------|--------------------------|----------------------------|------------------|--------------|-------------------|---------------------------|
| 970515.3 | <i>Procambarus (O.) blandningii</i> | trib. to Gum Swamp Creek | SR 1108 | Scotland | 15 May 1997 | 1M, 1MII, 1J, 2F | M.E. Savacool |
| 970612.2 | <i>Procambarus (O.) blandningii</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 1MII, 2F | M.E. Savacool |
| 970709.1 | <i>Procambarus (O.) acutus acutus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 1F | J.E. Cooper, G.B. Mottesi |
| 970722.1 | <i>Procambarus (O.) blandningii</i> | Richland Swamp | SR 1318 | Robeson | 22 July 1997 | 1MII, 1J, 2F | J.E. Cooper, G.B. Mottesi |
| 970723.1 | <i>Procambarus (O.) pearsei</i> | Muddy Creek | SR 1328, Sandhills Game. | Scotland | 23 July 1997 | 1F | J.E. Cooper, G.B. Mottesi |

Freshwater Fishes

Introduction

Approximately 790 fish species are believed to occur in the freshwaters of the United States and Canada (Page & Burr 1991). More than 225 species can be found in North Carolina (Menhinick 1991). This unusually rich and variable fish fauna is due to a great diversity of habitats found within the state and to different zoogeographic distribution patterns of various species. Many game species, several bait and forage species, and at least one aquarium species have become established in the waters of North Carolina (Menhinick 1991).

Unfortunately, almost one quarter of the fish occurring in North Carolina are state listed as Endangered, Threatened, or Special Concern species. This is of concern since fish are important components of aquatic ecosystems; they are indicators of water quality; and many species are a source of recreation for the state's citizens. Therefore, it is important that we determine their status/distributions and apply proper conservation techniques where necessary.

Methods

Study areas for this project included the aquatic habitats associated with the Lumber River Basin (Fig. 1, Introduction Section). Most habitats of the headwaters of the Lumber River Basin can be described as riffle/run with slow to fast flow. Pools of different sizes with slow flow were also present. Substrate included combinations of silt/sand/gravel/woody debris and leaf litter. Aquatic vegetation and organic debris were also present. The river habitat was slow to fast flow pools, with a silt/sand/gravel/woody debris and leaf litter substrate. Certain tributaries of the river were swampy with abundant aquatic vegetation. Throughout the basin there was a good hardwood/pine buffer with occasional cypress. The pH in this basin ranged from 4.3 - 7.2.

Fish were collected throughout the Lumber River Basin (Fig. 1). Collecting techniques included the use of a 6' x 10' minnow seine and dip nets. Different techniques of seining, such as kicking, and setting and dragging, were utilized according to the habitat. Specimens were fixed in 10% formalin and preserved in 70% ethanol. Specimens not collected were returned unharmed.

The following sources were used as identification tools: Jenkins (1995), Menhinick (1991), Page (1983), Page and Burr (1991), and Rohde, et al. (1994). Some identifications were verified using specimens from the collection of the NC State Museum of Natural Sciences. With the acquisition of more information, identifications may be subject to change.

Results and Discussion

Figure 1 details the localities of the forty-seven stations where fish were found. Forty species of fish representing thirteen families were found within the Lumber River Basin (Table 1).

Many of the species that we found in the Lumber River Basin, were also found by Keith Ashley (Fisheries Biologist, NCWRC) who lead a survey of the Lumber River from 1994-1997. His efforts involved the use of a boat shocker, which allowed access to the species that prefer the deeper and difficult to reach areas of the river itself. Following is a list of other species which his survey discovered.

| | | |
|------------------|------------------------|------------------|
| American eel | Eastern silvery minnow | Striped bass |
| Black crappie | Flat bullhead | Striped mullet |
| Black bullhead | Flathead catfish | Summer flounder |
| Blue catfish | Gizzard shad | Taillight shiner |
| Blueback herring | Hickory shad | White shad |
| Bowfin | Longnose gar | White catfish |
| Channel cat | Redear sunfish | |
| Common carp | Snail bullhead | |

Fish species diversity and abundance are good within the Lumber River Basin (Table 2). Three state listed species of Special Concern were detected by our survey, *Cyprinella zanema* (Jordan & Brayton, 1878), the Santee chub, *Semotilus lumbee* Snelson & Suttkus, 1978, the Sandhills chub, and *Etheostoma mariae* (Fowler, 1947), the Pinewoods darter. *Cyprinella zanema* was found at one site of the Lumber River proper. *Etheostoma mariae* was found among aquatic vegetation in the headwater streams of the basin, while *Semotilus lumbee* was found throughout the basin. Both *Semotilus lumbee* and *Etheostoma mariae* are endemic to the Carolina Sandhills area (Rohde & Arnt 1991).

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Table 1. Fish found in the Lumber River Basin

| | |
|---|----------------------|
| Cyprinidae | |
| <i>Cyprinella zanema</i> (Jordan & Brayton, 1878) | Santee chub |
| <i>Nocomis leptocephalus</i> (Girard, 1856) | Bluehead chub |
| <i>Notemigonus crysoleucus</i> (Mitchill, 1814) | Golden shiner |
| <i>Notropis chalybaeus</i> (Cope, 1869) | Ironcolor shiner |
| <i>Notropis chiliticus</i> (Cope, 1870) | Redlip shiner |
| <i>Notropis cummingsae</i> Myers, 1925 | Dusky shiner |
| <i>Notropis petersoni</i> Fowler, 1942 | Coastal shiner |
| <i>Semotilus lumbee</i> Snelson & Suttkus, 1978 | Sandhills chub |
| Catostomidae | |
| <i>Erimyzon oblongus</i> (Mitchill, 1814) | Creek chubsucker |
| <i>Erimyzon suetta</i> (Lacépède, 1803) | Lake chubsucker |
| <i>Minytrema melanops</i> (Rafinesque, 1820) | Spotted sucker |
| Ictaluridae | |
| <i>Ameiurus natalis</i> (Lesueur, 1819) | Yellow bullhead |
| <i>Noturus gyrinus</i> (Mitchill, 1817) | Tadpole madtom |
| <i>Noturus insignis</i> (Richardson, 1836) | Marginated madtom |
| Esocidae | |
| <i>Esox americanus</i> Gmelin, 1788 | Redfin pickerel |
| <i>Esox niger</i> Lesueur, 1818 | Chain pickerel |
| Umbridae | |
| <i>Umbrä pygmaea</i> (Dekay, 1842) | Eastern mudminnow |
| Aphredoderidae | |
| <i>Aphredoderus sayanus</i> (Gilliams, 1824) | Pirate perch |
| Amblyopsidae | |
| <i>Chologaster cornuta</i> Agassiz, 1853 | Swampfish |
| Atherinidae | |
| <i>Labidesthes sicculus</i> (Cope, 1865) | Brook silverside |
| Fundulidae | |
| <i>Fundulus lineolatus</i> (Agassiz, 1854) | Lined topminnow |
| Poeciliidae | |
| <i>Gambusia holbrooki</i> Girard, 1859 | Eastern mosquitofish |
| Elassomatidae | |
| <i>Elassoma zonatum</i> Jordan, 1877 | Banded pygmy sunfish |
| Centrarchidae | |
| <i>Acantharchus pomotis</i> (Baird, 1855) | Mud sunfish |
| <i>Centrarchus macropterus</i> (Lacépède, 1801) | Flier |
| <i>Chaenobrytus gulosus</i> (Cuvier, 1829) | Warmouth |
| <i>Enneacanthus chaetodon</i> (Baird, 1855) | Blackbanded sunfish |
| <i>Enneacanthus gloriosus</i> (Holbrook, 1855) | Bluespotted sunfish |
| <i>Enneacanthus obesus</i> (Girard, 1854) | Banded sunfish |
| <i>Lepomis auritus</i> (Linnaeus, 1758) | Redbreast sunfish |
| <i>Lepomis gibbosus</i> (Linnaeus, 1758) | Pumpkinseed sunfish |

Table 1. Fish found in the Lumber River Basin (cont.)

| | |
|---|--------------------|
| <i>Lepomis macrochirus</i> Rafinesque, 1819 | Bluegill sunfish |
| <i>Lepomis marginatus</i> (Holbrook, 1855) | Dollar sunfish |
| <i>Lepomis punctatus</i> (Valenciennes, 1831) | Spotted sunfish |
| <i>Micropterus salmoides</i> (Lacepède, 1802) | Largemouth bass |
| Percidae | |
| <i>Etheostoma mariae</i> (Fowler, 1947) | Pinewoods darter |
| <i>Etheostoma olmstedi</i> Storer, 1842 | Tessellated darter |
| <i>Etheostoma serrifer</i> (Hubbs & Cannon, 1935) | Sawcheek darter |
| <i>Perca flavescens</i> (Mitchill, 1814) | Yellow perch |
| <i>Percina crassa</i> (Jordan & Brayton, 1878) | Piedmont darter |

LUMBER RIVER BASIN FISH SPECIES INVENTORY

Figure 1.

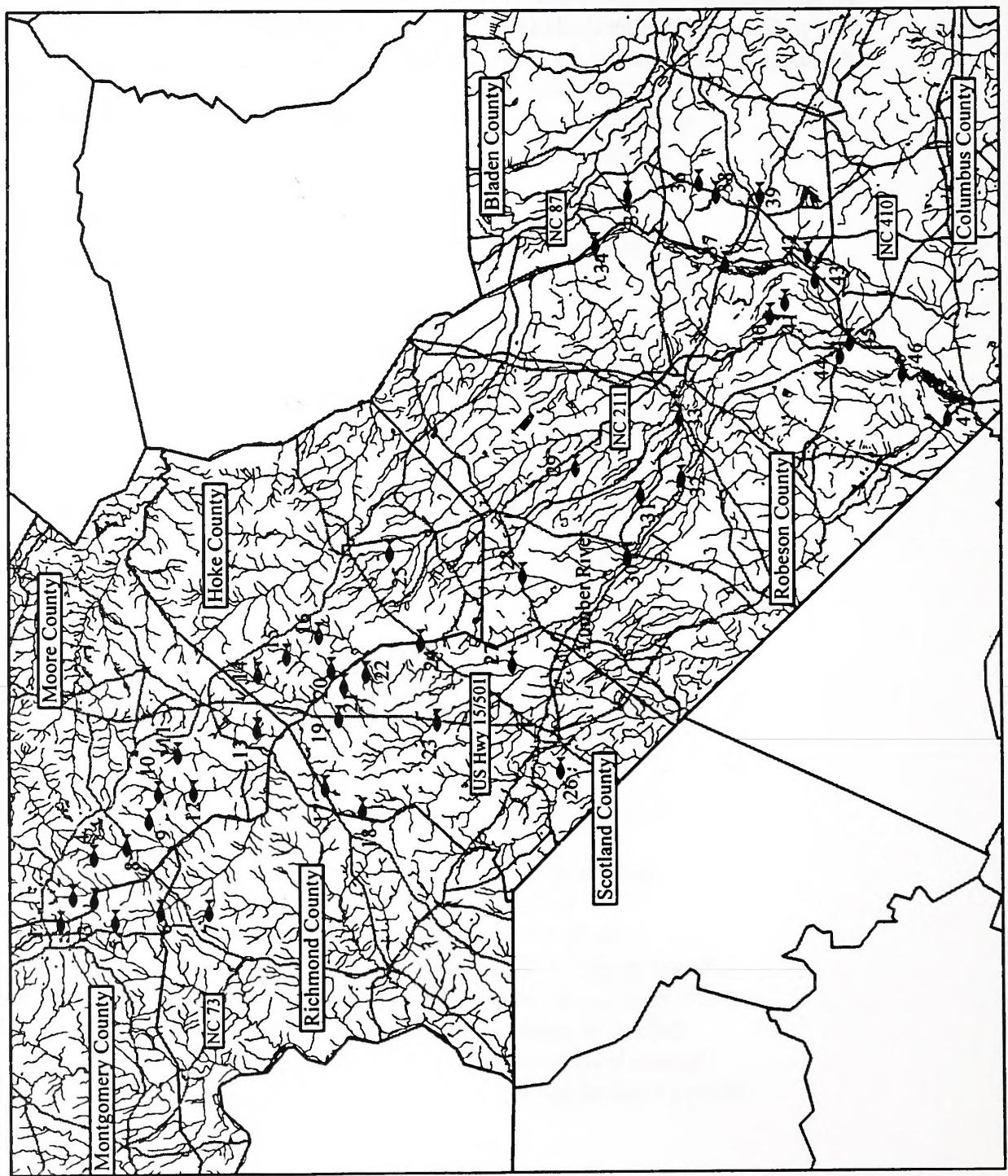


Table 2. Fish found in the Lumber River Basin

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No.</u> | <u>Identified By</u> |
|--------------------|--------------------------------|-----------------|---------------------------|------------------|--------------|------------|----------------------|
| 960716.1 | <i>Etheostoma olmstedi</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 16 July 1996 | 6 | G.B. Mottesi |
| 960716.1 | <i>Micropterus salmoides</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 16 July 1996 | 1 | G.B. Mottesi |
| 960716.1 | <i>Notropis petersoni</i> | Lumber River | SR 2246/2247, LRSP | Colum./Rob. line | 16 July 1996 | 2 | G.B. Mottesi |
| 960716.2 | <i>Acantharchus pomotis</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 1 | G.B. Mottesi |
| 960716.2 | <i>Ameiurus natalis</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 4 | G.B. Mottesi |
| 960716.2 | <i>Aphredoderus sayanus</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 3 | G.B. Mottesi |
| 960716.2 | <i>Centrarchus macropterus</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 2 | G.B. Mottesi |
| 960716.2 | <i>Chaenobrytus gulosus</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 1 | G.B. Mottesi |
| 960716.2 | <i>Chilogaster cornuta</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 4 | G.B. Mottesi |
| 960716.2 | <i>Elassoma zonatum</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 2 | G.B. Mottesi |
| 960716.2 | <i>Emeacanthus gloriosus</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 3 | G.B. Mottesi |
| 960716.2 | <i>Esox americanus</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 8 | G.B. Mottesi |
| 960716.2 | <i>Gambusia holbrookii</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 20 | G.B. Mottesi |
| 960716.2 | <i>Notropis cummingiae</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 1 | G.B. Mottesi |
| 960716.2 | <i>Umbra pygmaea</i> | Roadside ditch | SR 2256 | Robeson | 16 July 1996 | 4 | G.B. Mottesi |
| 960716.3 | <i>Acantharchus pomotis</i> | Roadside ditch | NC 130 | Robeson | 16 July 1996 | 11 | G.B. Mottesi |
| 960716.3 | <i>Umbra pygmaea</i> | Roadside ditch | NC 130 | Robeson | 16 July 1996 | 20 | G.B. Mottesi |
| 960716.4 | <i>Etheostoma olmstedi</i> | Roadside ditch | SR 1550 | Robeson | 16 July 1996 | 3 | G.B. Mottesi |
| 960716.4 | <i>Labidesthes sicculus</i> | Roadside ditch | SR 1550 | Robeson | 16 July 1996 | 1 | G.B. Mottesi |
| 960716.4 | <i>Lepomis auritus</i> | Roadside ditch | SR 1550 | Robeson | 16 July 1996 | 4 | G.B. Mottesi |
| 960716.4 | <i>Lepomis macrochirus</i> | Roadside ditch | SR 1550 | Robeson | 16 July 1996 | 2 | G.B. Mottesi |
| 960716.4 | <i>Notropis petersoni</i> | Lumber River | SR 1550 | Robeson | 16 July 1996 | 9 | G.B. Mottesi |
| 960716.4 | <i>Perca flavescens</i> | Lumber River | SR 1550 | Robeson | 16 July 1996 | 2 | G.B. Mottesi |
| 960717.1 | <i>Esox americanus</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.1 | <i>Etheostoma olmstedi</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.1 | <i>Etheostoma serifer</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.1 | <i>Gambusia holbrookii</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 6 | G.B. Mottesi |
| 960717.1 | <i>Lepomis auritus</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 2 | G.B. Mottesi |
| 960717.1 | <i>Lepomis marginatus</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 2 | G.B. Mottesi |
| 960717.1 | <i>Lepomis punctatus</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 3 | G.B. Mottesi |
| 960717.1 | <i>Notropis petersoni</i> | Lumber River | US 74, Wildlife Boat Ramp | Colum./Rob. line | 17 July 1996 | 19 | G.B. Mottesi |
| 960717.2 | <i>Fundulus lineolatus</i> | Roadside ditch | SR 2121 | Robeson | 17 July 1996 | 8 | G.B. Mottesi |
| 960717.2 | <i>Gambusia holbrookii</i> | Roadside ditch | SR 2121 | Robeson | 17 July 1996 | 2 | G.B. Mottesi |
| 960717.3 | <i>Acantharchus pomotis</i> | Roadside ditch | SR 2123 | Robeson | 17 July 1996 | 4 | G.B. Mottesi |
| 960717.3 | <i>Gambusia holbrookii</i> | Roadside ditch | SR 2123 | Robeson | 17 July 1996 | 2 | G.B. Mottesi |
| 960717.3 | <i>Umbra pygmaea</i> | Roadside ditch | SR 2123 | Robeson | 17 July 1996 | | |

Table 2. Fish found in the Lumber River Basin (cont.)

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No.</u> | <u>Identified By</u> |
|--------------------|-------------------------------|-----------------|------------------------|----------------|--------------|------------|----------------------|
| 960717.5 | <i>Aphredoderus sayanus</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 3 | G.B. Mottesi |
| 960717.5 | <i>Enneacanthus chaetodon</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.5 | <i>Enneacanthus gloriosus</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 2 | G.B. Mottesi |
| 960717.5 | <i>Erimyzon oblongus</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 7 | G.B. Mottesi |
| 960717.5 | <i>Esox americanus</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 4 | G.B. Mottesi |
| 960717.5 | <i>Etheostoma olmstedi</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.5 | <i>Etheostoma serifer</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 11 | G.B. Mottesi |
| 960717.5 | <i>Gambusia holbrookii</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 6 | G.B. Mottesi |
| 960717.5 | <i>Labidesthes sicculus</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 9 | G.B. Mottesi |
| 960717.5 | <i>Lepomis marginatus</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 11 | G.B. Mottesi |
| 960717.5 | <i>Lepomis punctatus</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.5 | <i>Micropterus salmoides</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 6 | G.B. Mottesi |
| 960717.5 | <i>Umbra pygmaea</i> | Big Swamp | SR 1002 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.7 | <i>Ameturus natalis</i> | Lumber River | NC 72 (boat ramp) | Robeson | 17 July 1996 | 2 | G.B. Mottesi |
| 960717.7 | <i>Esox americanus</i> | Lumber River | NC 72 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.7 | <i>Etheostoma olmstedi</i> | Lumber River | NC 72 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.7 | <i>Gambusia holbrookii</i> | Lumber River | NC 72 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.7 | <i>Lepomis auritus</i> | Lumber River | NC 72 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.7 | <i>Lepomis gibbosus</i> | Lumber River | NC 72 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.7 | <i>Lepomis macrochirus</i> | Lumber River | NC 72 (boat ramp) | Robeson | 17 July 1996 | 2 | G.B. Mottesi |
| 960717.7 | <i>Lepomis marginatus</i> | Lumber River | NC 72 (boat ramp) | Robeson | 17 July 1996 | 1 | G.B. Mottesi |
| 960717.7 | <i>Micropterus salmoides</i> | Lumber River | NC 72 (boat ramp) | Robeson | 18 July 1996 | n/a | G.B. Mottesi |
| 960718.1 | <i>Gambusia holbrookii</i> | Lumber River | US 401 to SR 1404 | Hoke/Scot.line | 18 July 1996 | 2 | G.B. Mottesi |
| 960718.2 | <i>Cyprinella zanema</i> | Lumber River | US 401 to SR 1404 | Hoke/Scot.line | 18 July 1996 | 1 | G.B. Mottesi |
| 960718.2 | <i>Esox americanus</i> | Lumber River | US 401 to SR 1404 | Hoke/Scot.line | 18 July 1996 | 7 | G.B. Mottesi |
| 960718.2 | <i>Etheostoma olmstedi</i> | Lumber River | US 401 to SR 1404 | Hoke/Scot.line | 18 July 1996 | 6 | G.B. Mottesi |
| 960718.2 | <i>Minytrema melanops</i> | Lumber River | US 401 to SR 1404 | Hoke/Scot.line | 18 July 1996 | 5 | G.B. Mottesi |
| 960718.2 | <i>Notropis Cummingsae</i> | Lumber River | US 401 to SR 1404 | Hoke/Scot.line | 18 July 1996 | 11 | G.B. Mottesi |
| 960718.2 | <i>Notropis petersoni</i> | Lumber River | US 401 to SR 1404 | Hoke/Scot.line | 18 July 1996 | 2 | G.B. Mottesi |
| 960718.2 | <i>Percina crassa</i> | Lumber River | US 15/501 | Scotland | 18 July 1996 | 1 | G.B. Mottesi |
| 960718.3 | <i>Enneacanthus gloriosus</i> | Juniper Creek | US 15/501 | Scotland | 18 July 1996 | 1 | G.B. Mottesi |
| 960718.3 | <i>Esox americanus</i> | Juniper Creek | US 15/501 | Scotland | 18 July 1996 | 1 | G.B. Mottesi |
| 960718.3 | <i>Etheostoma mariae</i> | Juniper Creek | US 15/501 | Scotland | 18 July 1996 | 1 | G.B. Mottesi |
| 960718.3 | <i>Etheostoma olmstedi</i> | Juniper Creek | US 15/501 | Scotland | 18 July 1996 | 2 | G.B. Mottesi |
| 960718.3 | <i>Notropis Cummingsae</i> | Juniper Creek | US 15/501 | Scotland | 18 July 1996 | 12 | G.B. Mottesi |
| 960718.3 | <i>Noturus insignis</i> | Juniper Creek | US 15/501 | Scotland | 18 July 1996 | 1 | G.B. Mottesi |

Table 2. Fish found in the Lumber River Basin (cont.)

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No.</u> | <u>Identified By</u> |
|--------------------|--------------------------------|-------------------------|------------------------|------------------|---------------|------------|----------------------|
| 960718.3 | <i>Semotilus lumbee</i> | Juniper Creek | US 15/501 | Scotland | 18 July 1996 | 1 | G.B. Mottesi |
| 970401.1 | <i>Etheostoma olmstedi</i> | Drowning Creek | SR 1514 | Mont./Moore line | 1 April 1997 | 1 | G.B. Mottesi |
| 970401.1 | <i>Gambusia holbrookii</i> | Drowning Creek | SR 1514 | Mont./Moore line | 1 April 1997 | 1 | G.B. Mottesi |
| 970401.1 | <i>Lepomis macrochirus</i> | Drowning Creek | SR 1514 | Mont./Moore line | 1 April 1997 | 1 | G.B. Mottesi |
| 970401.1 | <i>Semotilus lumbee</i> | Drowning Creek | SR 1514 | Mont./Moore line | 1 April 1997 | 1 | G.B. Mottesi |
| 970401.2 | <i>Etheostoma olmstedi</i> | Drowning Creek | SR 1571 | Mont./Moore line | 1 April 1997 | 2 | G.B. Mottesi |
| 970401.2 | <i>Nothonotus leptcephalus</i> | Drowning Creek | SR 1571 | Mont./Moore line | 1 April 1997 | 2 | G.B. Mottesi |
| 970401.2 | <i>Notropis chiltonicus</i> | Drowning Creek | SR 1571 | Mont./Moore line | 1 April 1997 | 21 | G.B. Mottesi |
| 970401.2 | <i>Semotilus lumbee</i> | Drowning Creek | SR 1571 | Mont./Moore line | 1 April 1997 | 1 | G.B. Mottesi |
| 970401.3 | <i>Etheostoma mariae</i> | Naked Creek | SR 1527 | Mont./Rich. line | 1 April 1997 | 5 | G.B. Mottesi |
| 970401.3 | <i>Etheostoma olmstedi</i> | Naked Creek | SR 1527 | Mont./Rich. line | 1 April 1997 | 1 | G.B. Mottesi |
| 970401.3 | <i>Nothonotus leptcephalus</i> | Naked Creek | SR 1527 | Mont./Rich. line | 1 April 1997 | 1 | G.B. Mottesi |
| 970401.3 | <i>Notropis cumminsae</i> | Naked Creek | SR 1527 | Mont./Rich. line | 1 April 1997 | 2 | G.B. Mottesi |
| 970401.4 | <i>Etheostoma serrifer</i> | Naked Creek | SR 1524 | Montgomery | 1 April 1997 | 6 | G.B. Mottesi |
| 970402.1 | <i>Acantharchus pomotis</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970402.1 | <i>Aphredoderus sayanus</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970402.1 | <i>Elassoma zonatum</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970402.1 | <i>Esox americanus</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970402.1 | <i>Etheostoma mariae</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 2 | G.B. Mottesi |
| 970402.1 | <i>Lepomis macrochirus</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 3 | G.B. Mottesi |
| 970402.1 | <i>Noturus insignis</i> | Horse Creek | SR 1115 | Moore | 2 April 1997 | 3 | G.B. Mottesi |
| 970402.2 | <i>Elassoma zonatum</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 3 | G.B. Mottesi |
| 970402.2 | <i>Emeumacanthus chaetodon</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 5 | G.B. Mottesi |
| 970402.2 | <i>Emeumacanthus gloriosus</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 2 | G.B. Mottesi |
| 970402.2 | <i>Esox americanus</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 2 | G.B. Mottesi |
| 970402.2 | <i>Notropis cumminsae</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 3 | G.B. Mottesi |
| 970402.2 | <i>Etheostoma mariae</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 5 | G.B. Mottesi |
| 970402.2 | <i>Etheostoma serrifer</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 7 | G.B. Mottesi |
| 970402.2 | <i>Fundulus lineolatus</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 14 | G.B. Mottesi |
| 970402.2 | <i>Notropis cumminsae</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970402.2 | <i>Noturus gyrinus</i> | Deep Creek | SR 1122 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970402.3 | <i>Esox americanus</i> | Deep Creek | SR 1112 | Moore | 2 April 1997 | 4 | G.B. Mottesi |
| 970402.3 | <i>Etheostoma mariae</i> | Deep Creek | SR 1112 | Moore | 2 April 1997 | 2 | G.B. Mottesi |
| 970402.3 | <i>Etheostoma olmstedi</i> | Deep Creek | SR 1112 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970402.3 | <i>Noturus gyrinus</i> | Deep Creek | SR 1112 | Moore | 2 April 1997 | 1 | G.B. Mottesi |
| 970402.4 | <i>Esox americanus</i> | trib. to Drowning Creek | SR 1122 | Moore | 15 April 1997 | 1 | G.B. Mottesi |
| 970415.1 | <i>Chaenobrytus gulosus</i> | trib. to Drowning Creek | SR 1129 | Moore | | | |

Table 2. Fish found in the Lumber River Basin (cont.)

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No.</u> | <u>Identified By</u> |
|------------------------|-----------------------------|---------------------------|----------------------------|---------------|---------------|------------|--------------------------|
| 970415.1 | <i>Etheostoma mariae</i> | trib. to Drowning Creek | SR 1129 | Moore | 15 April 1997 | 8 | G.B. Mottesi |
| 970415.1 | <i>Etheostoma omnesdi</i> | trib. to Drowning Creek | SR 1129 | Moore | 15 April 1997 | 6 | G.B. Mottesi |
| 970415.1 | <i>Etheostoma serifer</i> | trib. to Drowning Creek | SR 1129 | Moore | 15 April 1997 | 1 | G.B. Mottesi |
| 970415.1 | <i>Semotilus lumbee</i> | trib. to Drowning Creek | SR 1129 | Moore | 15 April 1997 | 1 | G.B. Mottesi |
| 970415.1 | <i>Chologaster cornuta</i> | trib. to Drowning Creek | SR 1100 | Moore | 15 April 1997 | 2 | G.B. Mottesi |
| 970415.2 | <i>Umbrapygmaea</i> | trib. to Drowning Creek | SR 1100 | Moore | 15 April 1997 | 1 | G.B. Mottesi |
| 970415.2 | <i>Aphredoderus sayanus</i> | trib. to Naked Creek | SR 1458 | Richmond | 15 April 1997 | 1 | G.B. Mottesi |
| 970415.3 | <i>Esox americanus</i> | trib. to Naked Creek | SR 1458 | Richmond | 15 April 1997 | 3 | G.B. Mottesi |
| 970415.3 | <i>Gambusia holbrookii</i> | trib. to Naked Creek | SR 1458 | Richmond | 15 April 1997 | 1 | G.B. Mottesi |
| 970415.3 | <i>Lepomis macrochirus</i> | trib. to Naked Creek | SR 1458 | Richmond | 15 April 1997 | 3 | G.B. Mottesi |
| 970415.3 | <i>Lepomis marginatus</i> | trib. to Naked Creek | SR 1458 | Richmond | 15 April 1997 | 3 | G.B. Mottesi |
| 970415.3 | <i>Notropis cummingsae</i> | trib. to Naked Creek | SR 1458 | Richmond | 15 April 1997 | 4 | G.B. Mottesi |
| 970415.4 | <i>Noturus insignis</i> | trib. to Drowning Cr. | NC 73 | Moore | 15 April 1997 | 2 | G.B. Mottesi |
| 970415.4 | <i>Semotilus lumbee</i> | trib. to Drowning Cr. | NC 73 | Moore | 15 April 1997 | 1 | G.B. Mottesi |
| 970415.5 | <i>Lepomis macrochirus</i> | trib. to Drowning Creek | SR 1139 | Moore | 15 April 1997 | 1 | G.B. Mottesi |
| 970415.5 | <i>Semotilus lumbee</i> | trib. to Drowning Creek | SR 1139 | Moore | 15 April 1997 | 2 | G.B. Mottesi |
| 970416.1 | <i>Esox americanus</i> | Little Creek | SR 1216 | Hoke | 16 April 1997 | 2 | G.B. Mottesi |
| 970416.1 | <i>Semotilus lumbee</i> | Little Creek | SR 1216 | Hoke | 16 April 1997 | 2 | G.B. Mottesi |
| 970416.2 | <i>Ameriurus natalis</i> | Buffalo Creek | SR 1214 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.2 | <i>Aphredoderus sayanus</i> | Buffalo Creek | SR 1214 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.2 | <i>Elassoma zonatum</i> | Buffalo Creek | SR 1214 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.2 | <i>Etheostoma serifer</i> | Buffalo Creek | SR 1214 | Hoke | 16 April 1997 | 3 | G.B. Mottesi |
| 970416.2 | <i>Gambusia holbrookii</i> | Buffalo Creek | SR 1214 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.2 | <i>Notropis cummingsae</i> | Buffalo Creek | SR 1214 | Hoke | 16 April 1997 | 4 | G.B. Mottesi |
| 970416.2 | <i>Umbrapygmaea</i> | Buffalo Creek | SR 1214 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.3 | <i>Aphredoderus sayanus</i> | Mountain Creek | SR 1219 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.2 | <i>Esox americanus</i> | Mountain Creek | SR 1219 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.3 | <i>Etheostoma mariae</i> | Mountain Creek | SR 1219 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.3 | <i>Noturus gyrinus</i> | Mountain Creek | SR 1219 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.5 | <i>Elassoma zonatum</i> | trib. to Quewhiffle Creek | SR 1214 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.5 | <i>Esox americanus</i> | trib. to Quewhiffle Creek | SR 1214 | Hoke | 16 April 1997 | 1 | G.B. Mottesi |
| 970416.5 | <i>Etheostoma mariae</i> | trib. to Quewhiffle Creek | SR 1214 | Hoke | 16 April 1997 | 4 | G.B. Mottesi |
| 970416.5 | <i>Notropis cummingsae</i> | trib. to Quewhiffle Creek | SR 1214 | Hoke | 16 April 1997 | 4 | G.B. Mottesi |
| 970417.1 | <i>Etheostoma mariae</i> | trib. to Drowning Creek | NC 15/501 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970417.1 | <i>Umbrapygmaea</i> | trib. to Drowning Creek | NC 15/501 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970417.2 | <i>Esox americanus</i> | trib. to Drowning Creek | SR 1400 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |

Table 2. Fish found in the Lumber River Basin (cont.)

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No.</u> | <u>Identified By</u> |
|--------------------|--------------------------------|--------------------------|------------------------|------------------|---------------|------------|----------------------|
| 970417.2 | <i>Etheostoma mariae</i> | trib. to Drowning Creek | SR 1400 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970417.2 | <i>Notropis cummingae</i> | trib. to Drowning Creek | SR 1400 | Scotland | 17 April 1997 | 4 | G.B. Mottesi |
| 970417.3 | <i>Aphredoderus sayanus</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970417.3 | <i>Chaenobryitus gulosus</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970417.3 | <i>Elassoma zonatum</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970417.3 | <i>Enneacanthus gloriosus</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | 7 | G.B. Mottesi |
| 970417.3 | <i>Etheostoma serifer</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970417.3 | <i>Notemigonus crysoleucas</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | 1 | G.B. Mottesi |
| 970417.3 | <i>Notropis cummingae</i> | trib. to Drowning Creek | SR 1412 | Scotland | 17 April 1997 | 12 | G.B. Mottesi |
| 970417.4 | <i>Etheostoma mariae</i> | trib. to Gum Swamp Creek | SR 1001 | Scotland | 17 April 1997 | 5 | G.B. Mottesi |
| 970417.4 | <i>Notropis cummingae</i> | trib. to Gum Swamp Creek | SR 1001 | Scotland | 17 April 1997 | 4 | G.B. Mottesi |
| 970417.4 | <i>Semotilus lunbee</i> | trib. to Gum Swamp Creek | SR 1001 | Scotland | 17 April 1997 | 3 | G.B. Mottesi |
| 970417.4 | <i>Umbra pygmaea</i> | trib. to Gum Swamp Creek | SR 1001 | Scotland | 17 April 1997 | 2 | G.B. Mottesi |
| 970515.2 | <i>Aphredoderus sayanus</i> | Big Shoe Heel Creek | SR 1433 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.2 | <i>Esox niger</i> | Big Shoe Heel Creek | SR 1433 | Scotland | 15 May 1997 | 2 | G.B. Mottesi |
| 970515.2 | <i>Etheostoma olmstedii</i> | Big Shoe Heel Creek | SR 1433 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.2 | <i>Lepomis auritus</i> | Big Shoe Heel Creek | SR 1433 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.2 | <i>Lepomis gibbosus</i> | Big Shoe Heel Creek | SR 1433 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.2 | <i>Lepomis macrochirus</i> | Big Shoe Heel Creek | SR 1433 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.2 | <i>Minytrema melanops</i> | Big Shoe Heel Creek | SR 1433 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.3 | <i>Aphredoderus sayanus</i> | trib. to Gum Swamp Creek | SR 1108 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.3 | <i>Chologaster cornuta</i> | trib. to Gum Swamp Creek | SR 1108 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.3 | <i>Elassoma zonatum</i> | trib. to Gum Swamp Creek | SR 1108 | Scotland | 15 May 1997 | 2 | G.B. Mottesi |
| 970515.3 | <i>Esox americanus</i> | trib. to Gum Swamp Creek | SR 1108 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.3 | <i>Gambusia holbrookii</i> | trib. to Gum Swamp Creek | SR 1108 | Scotland | 15 May 1997 | 1 | G.B. Mottesi |
| 970515.3 | <i>Umbra pygmaea</i> | trib. to Gum Swamp Creek | SR 1108 | Bladen | 12 June 1997 | 6 | G.B. Mottesi |
| 970612.1 | <i>Ameiurus natalis</i> | trib. to Bryans Swamp | NC 211 | Bladen | 12 June 1997 | 3 | G.B. Mottesi |
| 970612.1 | <i>Centrarchus macropterus</i> | trib. to Bryans Swamp | NC 211 | Bladen | 12 June 1997 | 2 | G.B. Mottesi |
| 970612.1 | <i>Esox americanus</i> | trib. to Bryans Swamp | NC 211 | Bladen | 12 June 1997 | 1 | G.B. Mottesi |
| 970612.1 | <i>Ameriurus natalis</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 1 | G.B. Mottesi |
| 970612.2 | <i>Aphredoderus sayanus</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 1 | G.B. Mottesi |
| 970612.2 | <i>Centrarchus macropterus</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 4 | G.B. Mottesi |
| 970612.2 | <i>Chologaster cornuta</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 1 | G.B. Mottesi |
| 970612.2 | <i>Enneacanthus gloriosus</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 1 | G.B. Mottesi |
| 970612.2 | <i>Erimyzon suetta</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 3 | G.B. Mottesi |
| 970612.2 | <i>Esox americanus</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 3 | G.B. Mottesi |

Table 2. Fish found in the Lumber River Basin (cont.)

| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No.</u> | <u>Identified By</u> |
|------------------------|---------------------------------|---------------------------|----------------------------|------------------|--------------|------------|--------------------------|
| 970612.2 | <i>Etheostoma servifer</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 1 | G.B. Mottesi |
| 970612.2 | <i>Gambusia holbrookii</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | abundant | G.B. Mottesi |
| 970612.2 | <i>Lepomis gibbosus</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 21 | G.B. Mottesi |
| 970612.2 | <i>Norropis cummingsae</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 2 | G.B. Mottesi |
| 970612.2 | <i>Umbrä pygmaea</i> | Big Swamp | NC 211 | Bladen/Rob. line | 12 June 1997 | 1 | G.B. Mottesi |
| 970612.3 | <i>Aphredoderus sayanus</i> | Big Swamp | SR 1004 | Bladen/Rob. line | 12 June 1997 | 21 | G.B. Mottesi |
| 970612.3 | <i>Chologaster cornuta</i> | Big Swamp | SR 1004 | Bladen/Rob. line | 12 June 1997 | 5 | G.B. Mottesi |
| 970612.3 | <i>Emeacanthus gloriosus</i> | Big Swamp | SR 1004 | Bladen/Rob. line | 12 June 1997 | 3 | G.B. Mottesi |
| 970612.3 | <i>Esox americanus</i> | Big Swamp | SR 1004 | Bladen/Rob. line | 12 June 1997 | 6 | G.B. Mottesi |
| 970612.3 | <i>Gambusia holbrookii</i> | Big Swamp | SR 1004 | Bladen/Rob. line | 12 June 1997 | abundant | G.B. Mottesi |
| 970612.3 | <i>Umbrä pygmaea</i> | Big Swamp | SR 1004 | Bladen/Rob. line | 12 June 1997 | 5 | G.B. Mottesi |
| 970709.1 | <i>Acantharcus pomotis</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 2 | G.B. Mottesi |
| 970709.1 | <i>Ameiurus natalis</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 20 | G.B. Mottesi |
| 970709.1 | <i>Aphredoderus sayanus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 4 | G.B. Mottesi |
| 970709.1 | <i>Centrarchus macropterus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 22 | G.B. Mottesi |
| 970709.1 | <i>Chaenobryttus gulosus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 4 | G.B. Mottesi |
| 970709.1 | <i>Emeacanthus gloriosus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 7 | G.B. Mottesi |
| 970709.1 | <i>Erimyzon oblongus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 6 | G.B. Mottesi |
| 970709.1 | <i>Esox americanus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 9 | G.B. Mottesi |
| 970709.1 | <i>Lepomis gibbosus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 3 | G.B. Mottesi |
| 970709.1 | <i>Lepomis macrochirus</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 10 | G.B. Mottesi |
| 970709.1 | <i>Notemigonus crysoleucas</i> | Slender Branch | NC 242 | Bladen | 9 July 1997 | 10 | G.B. Mottesi |
| 970709.2 | <i>Centrarchus macropterus</i> | trib. of Crawley Swamp | SR 1112 | Bladen | 9 July 1997 | 42 | G.B. Mottesi |
| 970709.2 | <i>Chaenobryttus gulosus</i> | trib. of Crawley Swamp | SR 1112 | Bladen | 9 July 1997 | 5 | G.B. Mottesi |
| 970709.2 | <i>Gambusia holbrookii</i> | trib. of Crawley Swamp | SR 1112 | Bladen | 9 July 1997 | abundant | G.B. Mottesi |
| 970709.2 | <i>Lepomis gibbosus</i> | trib. of Crawley Swamp | SR 1112 | Bladen | 9 July 1997 | 1 | G.B. Mottesi |
| 970709.2 | <i>Lepomis macrochirus</i> | trib. of Crawley Swamp | SR 1112 | Bladen | 9 July 1997 | 3 | G.B. Mottesi |
| 970709.2 | <i>Notemigonus chrysoleucus</i> | trib. of Crawley Swamp | SR 1112 | Bladen | 9 July 1997 | 6 | G.B. Mottesi |
| 970709.3 | <i>Ameturus natalis</i> | trib. of Crawley Swamp | NC 131 | Bladen | 9 July 1997 | 1 | G.B. Mottesi |
| 970709.3 | <i>Centrarchus macropterus</i> | trib. of Crawley Swamp | NC 131 | Bladen | 9 July 1997 | 21 | G.B. Mottesi |
| 970709.3 | <i>Esox americanus</i> | trib. of Crawley Swamp | NC 131 | Bladen | 9 July 1997 | common | G.B. Mottesi |
| 970709.3 | <i>Gambusia holbrookii</i> | trib. of Crawley Swamp | NC 131 | Bladen | 9 July 1997 | 11 | G.B. Mottesi |
| 970709.4 | <i>Centrarchus macropterus</i> | Black Reedy Meadows Swamp | SR 1341 | Robeson | 21 July 1997 | 1 | G.B. Mottesi |
| 970721.1 | <i>Ameiurus natalis</i> | Jordan's Swamp | NC 71 | Robeson | 21 July 1997 | 3 | G.B. Mottesi |
| 970721.1 | <i>Aphredoderus sayanus</i> | Jordan's Swamp | NC 71 | Robeson | 21 July 1997 | 57 | G.B. Mottesi |
| 970721.1 | <i>Centrarchus macropterus</i> | Jordan's Swamp | NC 71 | | | | |

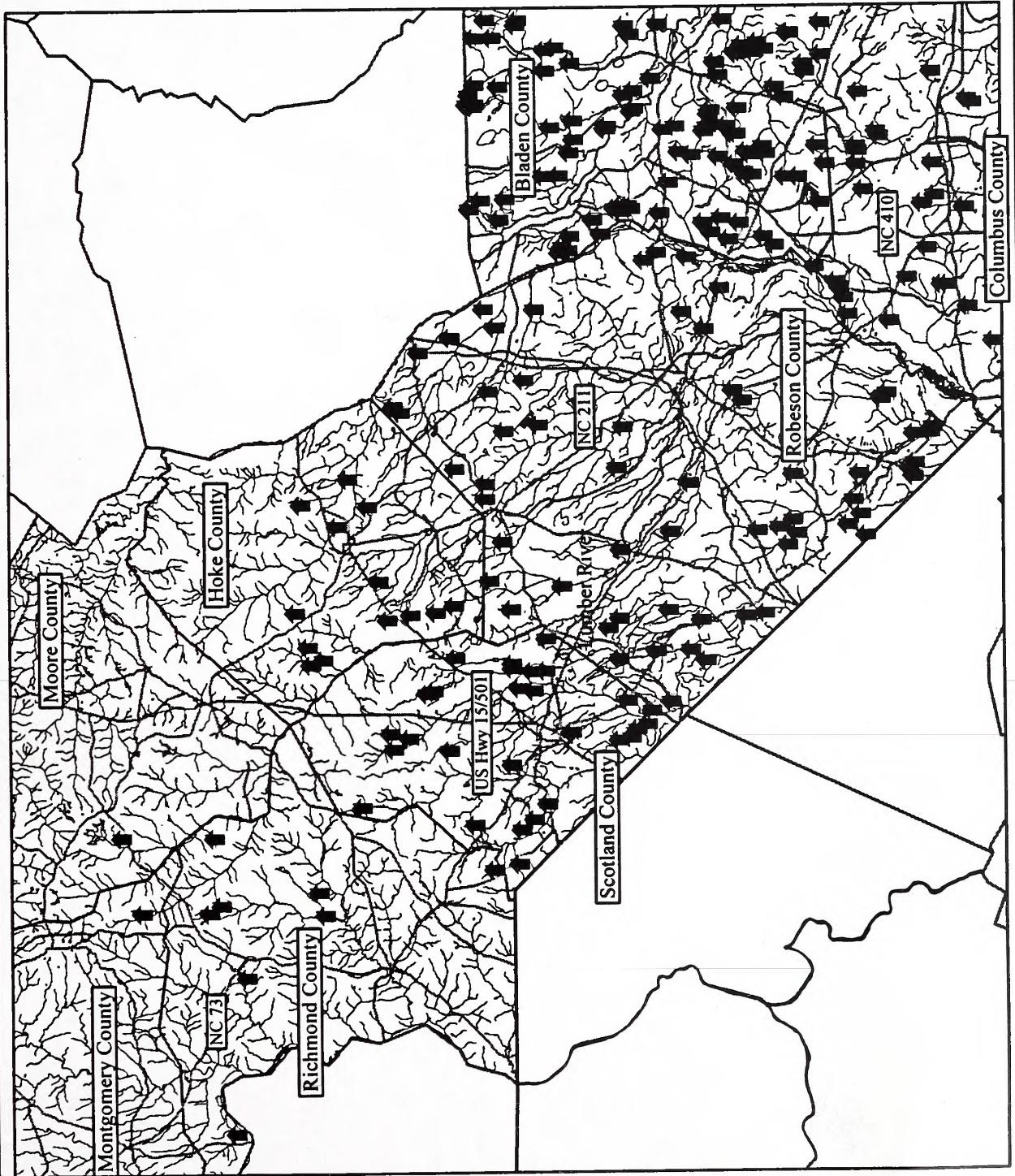
Table 2. Fish found in the Lumber River Basin (cont.)

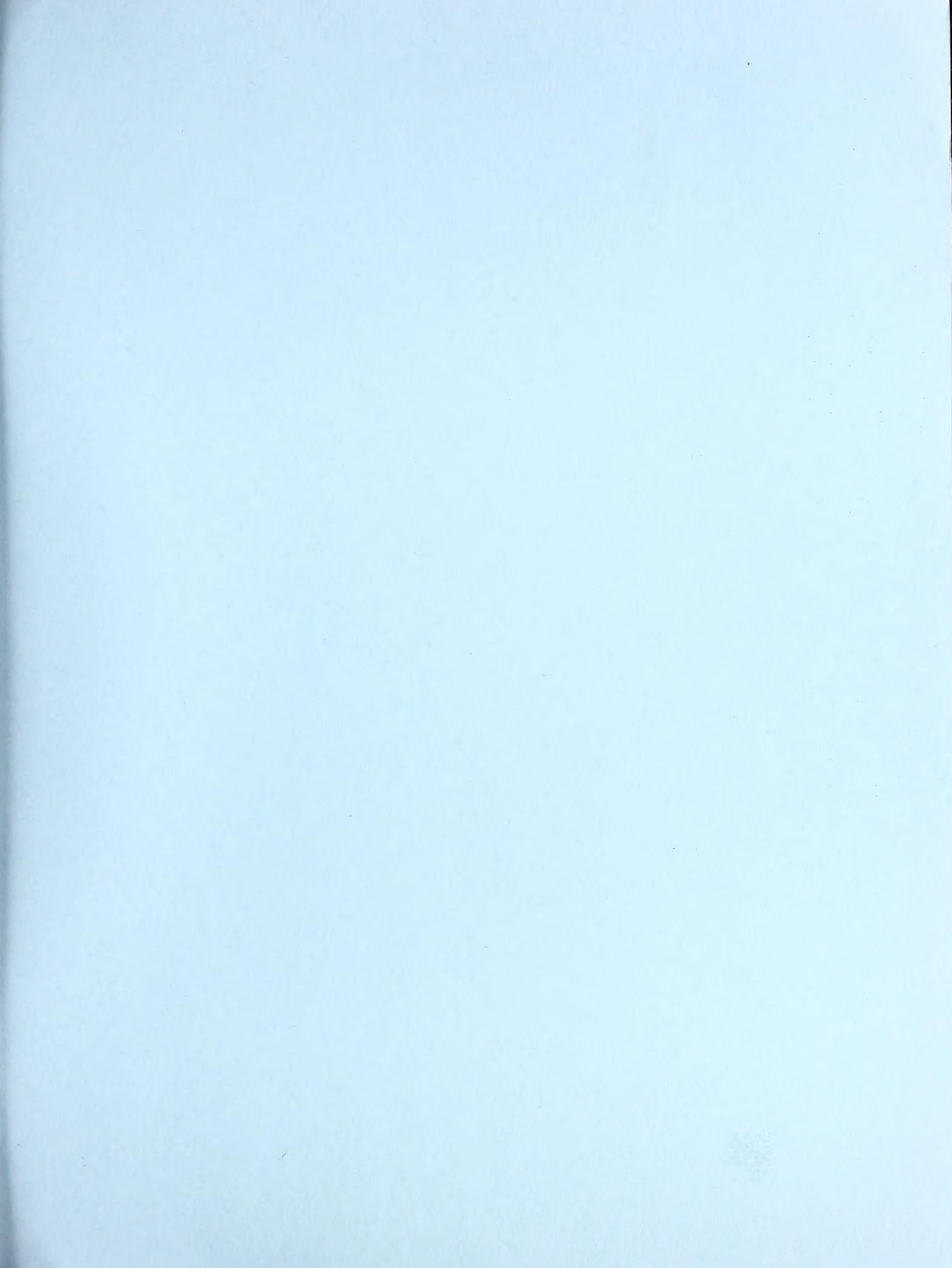
| <u>Station No.</u> | <u>Scientific Name</u> | <u>Waterway</u> | <u>Common Locality</u> | <u>County</u> | <u>Date</u> | <u>No.</u> | <u>Identified By</u> |
|--------------------|--------------------------------|-----------------|------------------------|--------------------------|--------------|------------|----------------------|
| 970721.1 | <i>Chaenobrytus gulosus</i> | Jordan's Swamp | Robeson | NC 71 | 21 July 1997 | 1 | G.B. Mottesi |
| 970721.1 | <i>Enneacanthus chaetodon</i> | Jordan's Swamp | Robeson | NC 71 | 21 July 1997 | 4 | G.B. Mottesi |
| 970721.1 | <i>Enneacanthus gloriosus</i> | Jordan's Swamp | Robeson | NC 71 | 21 July 1997 | 1 | G.B. Mottesi |
| 970721.1 | <i>Enneacanthus obesus</i> | Jordan's Swamp | Robeson | NC 71 | 21 July 1997 | 1 | G.B. Mottesi |
| 970721.1 | <i>Erimyzon sucetta</i> | Jordan's Swamp | Robeson | NC 71 | 21 July 1997 | 1 | G.B. Mottesi |
| 970721.1 | <i>Esox americanus</i> | Jordan's Swamp | Robeson | NC 71 | 21 July 1997 | 1 | G.B. Mottesi |
| 970721.1 | <i>Gambusia holbrookii</i> | Jordan's Swamp | Robeson | NC 71 | 21 July 1997 | abundant | G.B. Mottesi |
| 970721.1 | <i>Notemigonus crysoleucas</i> | Jordan's Swamp | Robeson | NC 71 | 21 July 1997 | 2 | G.B. Mottesi |
| 970721.1 | <i>Aphredoderus sayanus</i> | Bear Swamp | Robeson | SR 1003 | 21 July 1997 | 1 | G.B. Mottesi |
| 970721.2 | <i>Chologaster cornuta</i> | Bear Swamp | Robeson | SR 1003 | 21 July 1997 | 1 | G.B. Mottesi |
| 970721.2 | <i>Elassoma zonatum</i> | Bear Swamp | Robeson | SR 1003 | 21 July 1997 | 7 | G.B. Mottesi |
| 970721.2 | <i>Gambusia holbrookii</i> | Bear Swamp | Robeson | SR 1003 | 21 July 1997 | 6 | G.B. Mottesi |
| 970721.2 | <i>Umbra pygmaea</i> | Bear Swamp | Robeson | SR 1003 | 21 July 1997 | 2 | G.B. Mottesi |
| 970721.2 | <i>Etheostoma serifer</i> | Richland Swamp | Robeson | SR 1318 | 22 July 1997 | 1 | G.B. Mottesi |
| 970722.1 | <i>Gambusia holbrookii</i> | Richland Swamp | Robeson | SR 1318 | 22 July 1997 | abundant | G.B. Mottesi |
| 970722.1 | <i>Lepomis gibbosus</i> | Richland Swamp | Robeson | SR 1318 | 22 July 1997 | 1 | G.B. Mottesi |
| 970722.1 | <i>Micropterus salmoides</i> | Richland Swamp | Robeson | SR 1318 | 22 July 1997 | 3 | G.B. Mottesi |
| 970722.1 | <i>Notropis chalybaeus</i> | Richland Swamp | Robeson | SR 1318 | 22 July 1997 | 1 | G.B. Mottesi |
| 970722.1 | <i>Aphredoderus sayanus</i> | Toney's Creek | Hoke | SR 1138 | 22 July 1997 | 1 | G.B. Mottesi |
| 970722.2 | <i>Centrarchus macropterus</i> | Toney's Creek | Hoke | SR 1138 | 22 July 1997 | 1 | G.B. Mottesi |
| 970722.2 | <i>Elassoma zonatum</i> | Toney's Creek | Hoke | SR 1138 | 22 July 1997 | 8 | G.B. Mottesi |
| 970722.2 | <i>Gambusia holbrookii</i> | Toney's Creek | Hoke | SR 1138 | 22 July 1997 | abundant | G.B. Mottesi |
| 970722.2 | <i>Lepomis macrochirus</i> | Toney's Creek | Hoke | SR 1138 | 22 July 1997 | 1 | G.B. Mottesi |
| 970723.1 | <i>Aphredoderus sayanus</i> | Muddy Creek | Scotland | SR 1328, Sandhills Game. | 23 July 1997 | 5 | G.B. Mottesi |
| 970723.1 | <i>Chologaster cornuta</i> | Muddy Creek | Scotland | SR 1328, Sandhills Game. | 23 July 1997 | 1 | G.B. Mottesi |
| 970723.1 | <i>Elassoma zonatum</i> | Muddy Creek | Scotland | SR 1328, Sandhills Game. | 23 July 1997 | 1 | G.B. Mottesi |
| 970723.1 | <i>Enneacanthus gloriosus</i> | Muddy Creek | Scotland | SR 1328, Sandhills Game. | 23 July 1997 | 2 | G.B. Mottesi |
| 970723.1 | <i>Notropis chalybaeus</i> | Muddy Creek | Scotland | SR 1328, Sandhills Game. | 23 July 1997 | 3 | G.B. Mottesi |

Animal Facilities

The following map shows the animal facilities near and around the Lumber River Basin. This information was acquired from the Water Quality Section, Division of Environmental Management, North Carolina Department of Environment, Health, and Natural Resources.

LUMBER RIVER BASIN ANIMAL FACILITIES





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